PACIFIC SALMON COMMISSION
SELECTIVE FISHERY EVALUATION COMMITTEE

# REVIEW OF MASS MARKING AND MARK-SELECTIVE FISHERY ACTIVITIES PROPOSED TO OCCUR IN 2015

REPORT SFEC (15)-1

January 2015

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| Dr. Arlene Tompkins, CoTC Co-Chair, CDFO | |

[1] Past committee members who provided input to this report include: Mr. Kirt Hughes, WDFW; and Ms. Laurie Peterson, WDFW.

## LIST OF ACRONYMS WITH DEFINITIONS

| | | | |
|---|---|---|---|
| **ADFG** | Alaska Department of Fish and Game | **NWIFC** | Northwest Indian Fisheries Commission |
| **AK** | Alaska | **ODFW** | Oregon Department of Fish and Wildlife |
| **BC** | British Columbia | **OR** | Oregon |
| **BY** | Brood Year | **PS** | Puget Sound |
| **CA** | California | **PSC** | Pacific Salmon Commission |
| **CDFO** | Canadian Department of Fisheries and Oceans | **PSMFC** | Pacific States Marine Fisheries Commission |
| **CDFW** | California Department of Fish and Wildlife | **PST** | Pacific Salmon Treaty |
| **COLR** | Columbia River | **QIN** | Quinault Indian Nation |
| **CoTC** | Coho Technical Committee | **RMIS** | Regional Mark Information System |
| **CST** | Coast | **SFAWG** | SFEC- Analytical Work Group |
| **CTC** | Chinook Technical Committee | **SFEC** | Selective Fishery Evaluation Committee |
| **CWT** | Coded-Wire Tag | **SFRCWG** | Regional Coordination Work Group |
| **DIT** | Double-Index Tag | **SHRP** | Sport Head Recovery Program |
| **ER** | Exploitation Rate | **SJDF** | Strait of Juan de Fuca |
| **ETD** | Electronic Tag Detection | **TERM** | Terminal Fishery |
| **ID** | Idaho | **URB** | Upriver Bright (Fall Chinook) |
| **IDFG** | Idaho Department of Fish and Game | **US** | United States |
| **MM** | Mass Marking | **VTR** | Voluntary Trip Report |
| **MOU** | Memorandum of Understanding | **WA** | Washington |
| **MSF** | Mark-Selective Fishery | **WCVI** | West Coast Vancouver Island |
| **MU** | Management Unit | **WDFW** | Washington Department of Fish and Wildlife |
| **NSF** | Non-Selective Fishery | | |

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# EXECUTIVE SUMMARY

This report provides a summary of the proposed coastwide plans for mass marking (MM) of Coho and Chinook salmon and the conduct of mark-selective fisheries (MSFs) in 2013. Issues with implications for maintenance of the coastwide coded-wire tag program are identified and recommendations are proposed.

## *Summary of 2013 Mass Marking Proposals*

Throughout this report a mass-marked fish refers to a fish with an adipose fin clip and a double-index tag (DIT) group includes two related coded-wire tag (CWT) groups, one marked and one unmarked. The terms 'marked' and 'clipped', and likewise 'unmarked' and 'unclipped', are used interchangeably.

### Mass Marking and DIT Programs

Twenty-two proposals (8 for Coho and 14 for Chinook) were received for mass marking (MM) occurring in 2013 (Appendix E). Of these, 21 were received from southern British Columbia (BC) and southern United States (US) and one proposal was received from Alaska Department of Fish and Game (ADFG) to mass mark 300,000 Chinook released into Cook Inlet. The Selective Fishery Evaluation Committee (SFEC) believes these proposals cover all MM programs of relevance to the Pacific Salmon Commission (PSC).

Within the 21 MM proposals received from southern BC and southern US, approximately 35 million Coho are proposed to be mass-marked in 2013 (Table 2-1, Figure 2-1A), a level comparable to that proposed in 2012. Essentially all hatchery Coho production intended for harvest, from southern BC and southern US hatcheries will be mass marked. Currently there are 18 proposed Coho Salmon DIT groups (Table 2-1), of which two will be released from southern BC, seven from Puget Sound, five from the Washington (WA) coast, and four from the Columbia River Basin.

Approximately 114 million Chinook are proposed to be mass marked in 2013 from southern US Chinook hatcheries (Table 2-1; Figure 2-1B). This is approximately 1 million more than were proposed for 2012. Most all hatchery Chinook production from southern US hatcheries intended for harvest will be mass marked. Currently there are 14 proposed Chinook Salmon DIT groups (Table 2-1, Appendix H), of which seven will be released from Puget Sound facilities, two from coastal facilities, and five from Columbia River facilities.

### Sampling Programs

Assuming recent exploitation rates and sampling programs, the SFEC estimates the proposed mass marking of Coho stocks in 2013 will result in annual encounters of untagged marked Coho in sampling programs of approximately 400 Coho in Alaska (AK) and 3,000 Coho in Canada (Table 2-4). For southern US Chinook stocks, annual encounters of untagged marked Chinook in sampling programs are projected to be approximately 9,300 Chinook in AK, 14,000 Chinook in Canada, and 1,300 Chinook in California (Table 2-4).

Prior to MM, the adipose fin clip was employed as a visual indicator for fish containing a CWT. Consequently, sampling programs which were designed to collect heads from fish with missing

adipose fins resulted in samples of heads, all which contained CWTs. With MM, a large number of marked fish do not contain CWTs; further, CWTs must be recovered from both marked and unmarked fish to obtain data for DIT group releases to estimate fishery impacts. Electronic tag detection (ETD) equipment has been developed as a means to efficiently identify marked and unmarked fish containing CWTs. However, ETD is not employed coastwide because of continuing reservations by some agencies regarding the cost, accuracy, and practical feasibility of incorporating this technology into their sampling programs. The Alaska Department of Fish and Game (ADF&G), Canadian Department of Fisheries and Oceans (CDFO), Oregon Department of Fish and Wildlife (ODFW), and California Department of Fish and Wildlife (CDFW) all conduct sampling programs which will not recover the unclipped component of DIT programs required to assess impacts of MSFs. Fisheries from which recoveries of the unmarked component of a DIT group should have been observed create gaps in analyses of fishery impacts on unmarked (wild) fish.

Considering sampling programs coastwide, some agencies already implement comprehensive electronic sampling strategies to recover CWTs from sport and commercial fisheries, while other agencies are still working to increase use of ETD. Washington State continues to fully implement electronic sampling statewide and consistently reports CWT recoveries of the unmarked components of DIT groups in recreational marine and some freshwater MSFs, as well as in non-selective fisheries (NSFs). Starting in 2008, Canada also committed to full electronic sampling and reporting of all CWTs in all commercial fisheries for Chinook. Coho in Canadian commercial fisheries are visually sampled, except for heads delivered by northern 'freezer' trollers, which are electronically sampled. Canada continues to rely on the Sport Head Recovery Program (SHRP) to recover CWTs from NSFs and MSFs alike and thus, no unmarked coded-wire-tagged recoveries are available from them. Oregon Department of Fish and Wildlife continues to use visual sampling for fall Chinook and electronic sampling for spring Chinook and Coho in the Columbia River. Beginning in 2011, ODFW initiated electronic sampling of all ocean recreational and commercial salmon fisheries off the coast of Oregon (OR).

Encounters of large numbers of mass-marked Chinook are increasingly impacting catch sampling programs in northern fisheries, for example, approximately 63% of the Chinook caught in 2012 in the southeast Alaskan troll fishery with a missing adipose fin did not contain a CWT (Figure 2-3). The increased costs to deal with the additional marked fish (e.g., storage, and shipping to and sorting of heads in the dissection laboratories) are not quantified, but will impact the programs.

A new type of electronic CWT detection wand, the "T-wand", is now available. The manufacturer believes the increased sensitivity of these wands should detect all CWTs.

## *Summary of 2013 Mark-Selective Fishery Proposals*

MSFs have been prosecuted for Coho since 1998 and for Chinook since 2003. For 2013, the SFEC received 43 MSF proposals for Coho and Chinook salmon in CDFO, WDFW, and ODFW fisheries. The SFEC believes these proposals cover all MSFs planned for 2013 of relevance to the PSC. The proposals submitted to the SFEC for review are listed in Table 3-1 (also see Appendix F). Further details describing the proposed MSFs and comments by the SFEC are provided in Table 3-2 and Table 3-3.

Fifteen proposals were received for Coho Salmon MSF's to occur in 2013 and 29 proposals were received for Chinook Salmon MSF's. Agencies provided the majority of the requested information in each of the proposals and the proposals were submitted on time.

SFEC received five proposals for new mark-selective fisheries. Oregon Department of Fish and Wildlife and WDFW jointly submitted two proposals for commercial fisheries targeting Coho and Chinook in the Lower Columbia River. The remaining three proposals were submitted by WDFW for Chinook sport MSF's on the Snohomish and Lower Grand Ronde rivers and a commercial Chinook fishery in Grays Harbor.

Up until 2008, Chinook MSF's were largely restricted to Puget Sound and Columbia River spring Chinook. Since then, Chinook MSF's have expanded substantially in marine and freshwater areas. In 2007, 12 Chinook MSF's were prosecuted; in 2010, that number doubled to 24 Chinook MSF's and a larger number of indicator stocks are now vulnerable to being encountered in MSF's.

The majority of MSF proposals are for terminal marine or freshwater areas, each of which will impact mature fish of one to several stocks. Multiple MSF's for both Coho and Chinook are also expected to occur in ocean areas in 2013 in BC, WA (WA ocean areas 1 through 4 and the Columbia River), and OR. These fisheries will impact many stocks and also multiple broods of Chinook. Table 2-4 provides estimates of projected encounters of fish to be mass marked in 2013 in future regional fishery sampling programs. These estimates are based on the number of mass-marked fish released by each participating agency. Table 3-4 and Table 3-5 each provide historical information on encounters of tagged and marked fish to identify Coho and Chinook tagged stocks that can be expected in these areas with MSF's.

## Issues and Concerns

### Post-season Reports

Post-season reports on MSF's are required for each MSF prosecuted. One of the basic functions of these reports is to provide a record of how fisheries were actually prosecuted (whether they took place) and whether there were any changes in the way the fisheries and sampling programs were conducted relative to the proposal. These reports are to be submitted in the form of three tables (Appendix I). The first two tables should be submitted by the annual PSC post-season meeting following the year of the fishery. No SFEC MSF post-season reports/tables were found in the US or Canadian post-season reports (Jan 2013). Although these SFEC tables are not included in the PSC post-season reports, CDFO and WDFW do provide fishery regulations and preliminary landed catch estimates for mark-selective fisheries in these reports.

### Mixed-Bag Regulations

Regulations to implement MSF's are increasingly complex, making analyses to estimate impacts challenging in a number of ways. Different types of mixed bag regulations are part of the MSF's proposed by Canada, Washington, and Oregon for recreational fisheries. As MSF's expand, a variety of types of mixed bag regulations are being proposed. The regulations include a range of rules that specify when and how anglers may retain various combinations of adult and juvenile marked and unmarked fish in their daily bag limits. The SFEC is not aware of reliable methods for estimating impacts on marked and unmarked fish under mixed bag regulations and the

agencies proposing these mixed-bag regulations should assist in developing the analytical tools to measure the impacts of these fisheries.

## Recommendations and Issues Requiring PSC Direction

### Proposal Review Process

It is recommended that the PSC request agencies to submit proposals for all pending SHARE and MSF's by November 2011, and for agencies to provide both preliminary and final post-season reports on the conduct of MSF's within the timeframe adopted by the PSC. Agencies need to prioritize these tasks so that proposals and MSF post-season reports are completed and submitted in a timely manner.

### Interagency Coordination and Cooperation

Mass marking, double-index tagging, and CWT sampling programs continue to be insufficiently coordinated to support analysis by PSC technical committees. It is also not clear that agencies are collecting adequate and necessary data to permit estimation of unmarked CWT recoveries in fisheries and escapements so that Cohort reconstructions can be carried out on the unmarked component of the ORT group releases. With the expansion of Chinook marine MSF's, the geographical range of electronic CWT sampling needs to be expanded and the number of double-index-tagged stocks needs to be increased. Specifically, ETD audit is to be implemented by ODFW for Oregon Columbia River fall Chinook fisheries and equipment to recover ORT groups for Chinook indicator stocks. In addition, ORT groups should be added for the following Chinook stocks:

- Lower Columbia River late fall Chinook (possibly Washougal);
- Columbia River summers (Wells Hatchery);
- Snake River fall subyearlings (Lyons Ferry Hatchery);
- Willamette Spring Chinook ORT program with electronic sorting and sampling;
- North Oregon Coast (Salmon River); and,
- Mid-Oregon Coast.

The PSC should continue to support technical and policy processes to develop agreements to clarify responsibilities for maintaining a functional CWT system. Those processes should build upon recommendations presented by the CWT Work Group in 2008.

# 2 Related Work

## 2.1 Video Matching Proposals Received

[illegible] Video matching proposals are [illegible] Video matching [illegible] Video matching [illegible] [illegible] [illegible]

Table 2-1 Mass marking of Coho and Chinook salmon and number of DIT groups proposed for 2002 and 2003[1]

| Species | Area | Run | Agency | DIT Groups | Mass Marking (millions) 2002 | 2003 | Significant Changes from 2002 |
|---|---|---|---|---|---|---|---|
| Coho | Straits of Georgia | | CDFO | 2 | 0.5 | 0.5 | |
| | W. Coast of Vanc. Isl. | | CDFO | 0 | 0.8 | 0.5 | |
| | Puget Sound | | WDFW/Tribal | 6 | 10.5 | 10.2 | |
| | | | USFWS | 1 | 0.5 | 0.5 | |
| | WA Coast | | USFWS | 1 | 0.8 | 0.7 | Dropped DIT program at Makah |
| | | | WDFW/Tribal | 6 | 6.5 | 6.5 | |
| | OR Coast | | ODFW | 6 | 0.5 | 0.5 | |
| | Columbia Basin | | USFWS | 1 | 0.5 | 0.5 | Includes production previously unreported |
| | | | WDFW | 2 | 7.6 | 7.9 | |
| | | | ODFW | 1 | 0.5 | 0.5 | |
| | | Total Coho | | 19 | 29.5 | 29.5 | |
| Chinook | BC | L. Fraser ♦ | CDFO | | | | Dropped with BY 2001 |
| | Puget Sound | Spring | WDFW/Tribal | 1 | 0.8 | 0.7 | Dropped Nooksack Spring DIT program |
| | | Summer | WDFW/Tribal | 1 | 2.8 | 2.7 | |
| | | Fall | WDFW/Tribal | 7 | 20.5 | 20.9 | |
| | WA Coast | Spr/Sum | WDFW/Tribal | 6 | 0.5 | 0.5 | |
| | | Fall | USFWS | 6 | 2.5 | 3.0 | |
| | | | WDFW/Tribal | 2 | 7.9 | 8.2 | |
| | OR Coast | N. Spring | ODFW | 6 | 0.8 | 0.8 | |
| | | S. Spring | ODFW | 6 | 2.1 | 2.1 | |
| | | Fall | ODFW | 6 | 1.6 | 2.0 | |
| | Columbia Basin | Spring | ODFW (Willamette) | 6 | 8.2 | 9.3 | |
| | | | ODFW (Col. R) | 6 | 0.5 | 0.6 | |
| | | | USFWS | 6 | -- | 1.2 | Includes production previously unreported |
| | | | WDFW | 1 | 5.9 | 5.6 | |
| | | Fall-Tule | USFWS | 1 | 10.2 | 10.2 | |
| | | | WDFW | 6 | 20.0 | 19.7 | |
| | | | ODFW | 1 | 7.9 | 7.9 | |
| | | Fall URB | WDFW | 1 | 6.6 | 6.6 | |
| | | | ODFW | 6 | 7.6 | 8.5 | |
| | | | USFWS | 1 | 3.6 | 5.1 | Includes production previously unreported |
| | | Snake R. Fall | IDFG | 6 | 0.6 | --[2] | |
| | | | ODFW | 6 | 0.6 | 0.6 | |
| | | Snake R. Spring | ODFW | 6 | 0.5 | 0.5 | |
| | | | USFWS | 6 | -- | 1.5 | Includes production previously unreported |
| | | Total Chinook | | 98 | 115.5 | 118.8 | |

[1] Does not include IDFG's proposal to mass mark 100,000 Chinook in Crooks Inlet.
[2] Did not receive a proposal

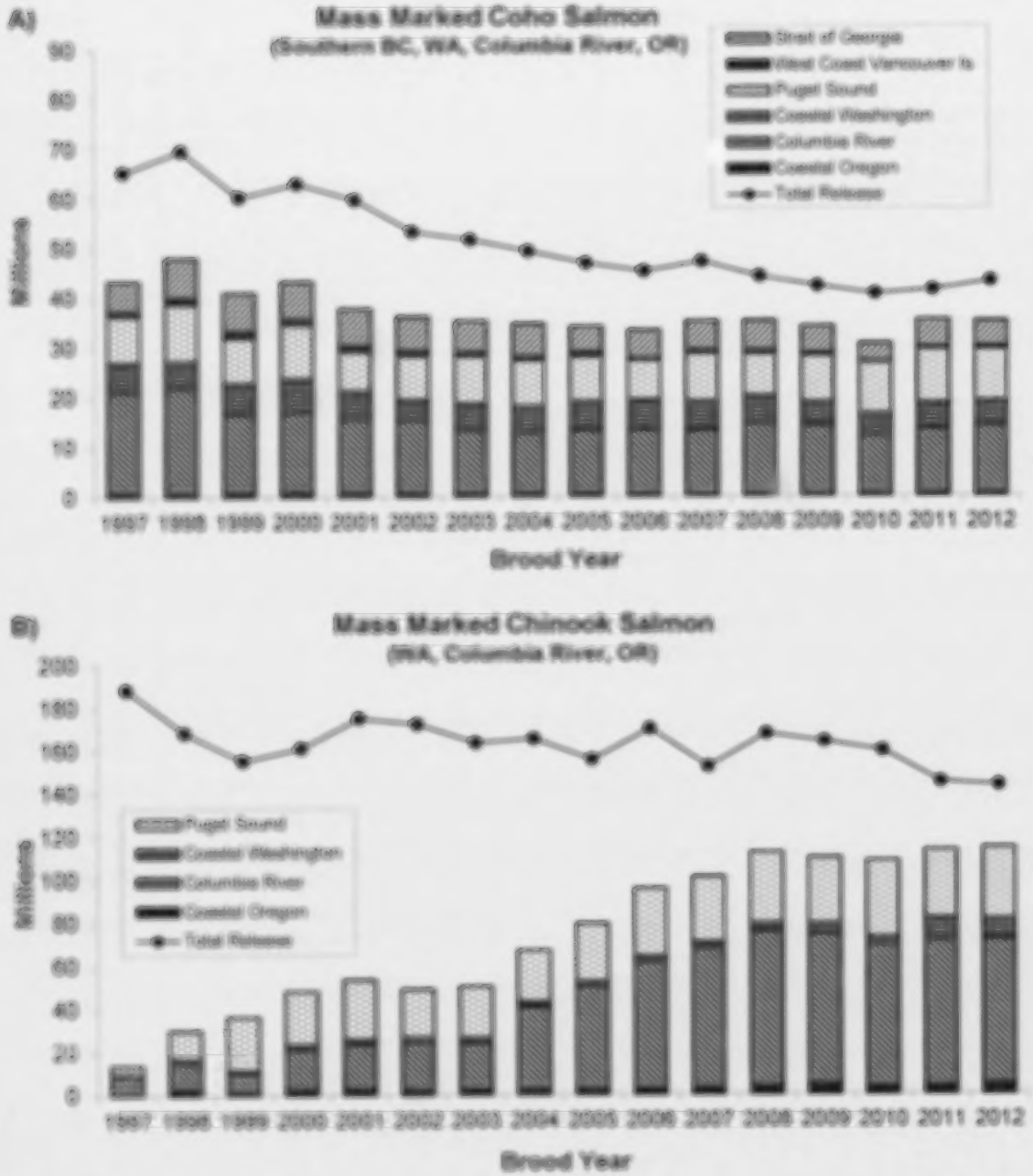


Figure 2-1. Number of mass marked Coho (panel A) and Chinook salmon (panel B) released by region and brood year, 1997–2012. The solid line represents total hatchery releases by brood year with the exception that fry releases of Coho are not included. Values used for brood years 1997–2010 are actual release sizes, values for brood years 2011 and 2012 are proposed release sizes.

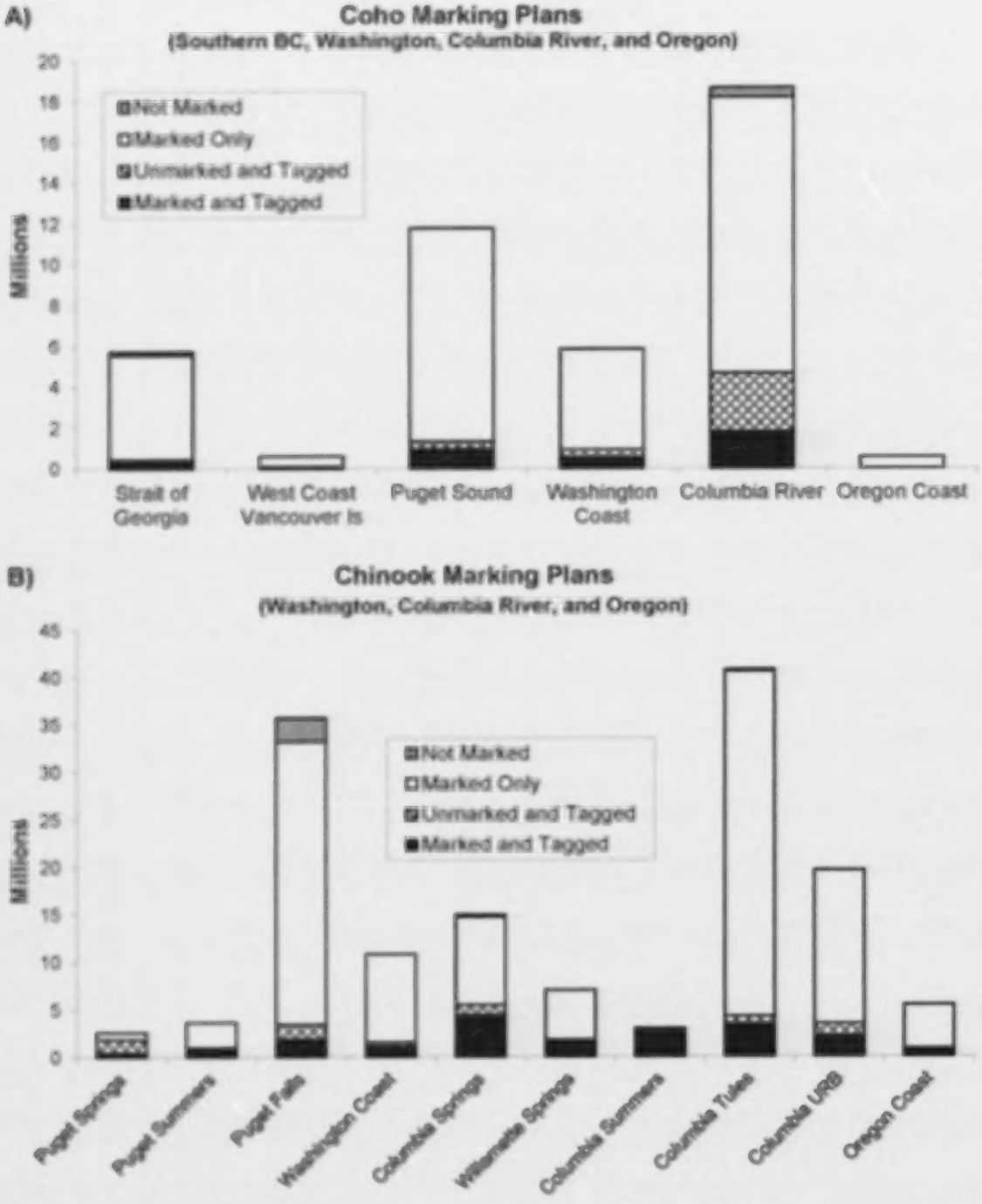


Figure 2-2. Projected Coho (panel A) and Chinook (panel B) salmon releases for brood year 2012, by region and mark status.

## *2.4 Fishery and Escapement Sampling Methods*

### 2.4.1 Current Agency Sampling Methods

Two methods are currently used to detect fish containing CWTs. The traditional visual sampling method relies upon the adipose fin clip as a visual indicator for a CWT. When visual sampling is used, only CWTs from marked fish will be detected. Electronic tag detection (ETD) uses electronic gear (hand-held wand or fixed-position tube) to detect CWTs in marked and unmarked fish. When marked fish are first visually separated in the sample and electronic gear is then used to detect tags in the marked fish, this is considered visual sampling because tags are only recovered from marked and tagged fish. Visual sampling results in a lack of recovery of the unmarked component of DIT release groups, creating data gaps in the analysis of CWT data and increased uncertainty in the estimated impacts on unmarked (wild) fish. These gaps also require indirect estimation procedures to complete them thus making analyses more time consuming and the results more uncertain.

Current coded-wire-tag sampling methods for Coho and Chinook are summarized in Table 2-2 and Table 2-3, respectively. Electronic tag detection has not been implemented for all fisheries encountering mass-marked fish. In general, ETD has become the standard CWT sampling method in WA and ID. Visual CWT sampling remains the standard method in AK and CA. In BC and OR the situation is more complex, where sampling methods depend on species, location, and the type of fishery.

Alaska Department of Fish and Game has no plans to convert to ETD sampling although there is growing concern about the large numbers of clipped fish without CWTs encountered in sampling programs. Of the marked Chinook caught in Alaska's troll fishery since the implementation of MM, the proportion of fish with no tags has increased from approximately 7% to 65% (Figure 2-3). The increased cost to deal with the additional marked fish is not quantified, but impacts the program. Costs to ship all the heads, including those with no CWTs, from sampling locations to the dissection lab are substantial.

California does not employ ETD. However, approximately 1,300 mass-marked Chinook are projected to be encountered annually in CA (Table 2-4), which could impact CA's sampling program.

Canada relies on voluntary recoveries of marked Coho and Chinook in recreational fisheries (regardless of whether mark-selective or non-selective regulations are used), while the current restricted commercial fisheries are electronically or visually sampled depending on species and location (Table 2-2). As in AK, the DFO SHRP program has seen an increase in the submission of heads without tags as well as a decrease in the submission rate of heads as fewer anglers turn in heads. Since 2008, Coho landed by 'ice' or 'day boats' in the northern BC troll fishery are not subject to electronic sampling. In that fishery, Coho are sampled visually and CWTs from marked fish only are recovered. Electronic sampling is being used for both species in commercial fisheries South of Cape Caution, located just northward of the northern tip of Vancouver Island on the mainland coastline.

Coded-wire-tag sampling in Oregon hatcheries is predominantly electronic; however, CWT sampling at most freshwater traps and on spawning grounds remains visual. Since 2011, ETD has been used to CWT sample both the sport and commercial troll Chinook and Coho fisheries that occur off the coast of Oregon. However, the impacts of large abundances forecasted for Sacramento and Klamath River fall Chinook combined with the 25% fractional marking program in CA could affect proposed electronic sampling of the commercial troll fisheries when high-volume loads are encountered by samplers.

The Oregon ocean sport Chinook fishery is mostly non-selective, with the exception of a 2-week season in June between Leadbetter Pt., WA and Cape Falcon, OR. The majority of the sport Coho fishery is mark-selective; however, a limited non-selective quota fishery occurs in September from Cape Falcon to Humbug Mountain. Oregon's ocean commercial troll fishery is non-selective for Chinook and mark-selective for Coho North of Cape Falcon. From Cape Falcon southward to the OR/CA border, the commercial Chinook fishery is non-selective. Coho retention in the commercial troll fishery is prohibited from Cape Falcon to the OR/CA border.

Columbia River sport and commercial fisheries are electronically sampled for spring and summer Chinook (January–July) and also Coho. Fall Chinook (August–October) fisheries (commercial and sport) are visually sampled by Oregon (only adipose-clipped fish are wanded to determine if CWT present), except for the Buoy 10 sport fishery in the estuary where electronic sampling has been used in recent years.

Some controversy remains regarding the reliability of wands for detecting CWTs in Chinook. CDFO has adopted a policy of not using wands in either fishery or escapement sampling except when a tube detector fails or a Chinook is too large to pass through the tube detector. CDFO carried out a blind study over a 2-year period in the Fraser River Albion Chinook test fishery with trained staff using hand-held wands and found that CWTs were missed when actually present and detected when not present at a rate significantly greater than expected by chance (Parken and Riddell 2007). Most importantly, missed detections and false detections occurred at higher rates in unmarked fish compared to marked fish. However, the results of the Canadian study contradict all other previous blind studies testing the efficacy of wands in detecting CWTs in Chinook, where detection rates ranged from 91 to 99% (Olson 2007). The difference in the results of these studies is disconcerting, and it has yet to be determined whether this difference is due to sampling technique or equipment.

The manufacturer of the wands (Northwest Marine Technology, Inc.) has the ability to test and increase the detection range of wands to a new minimum standard (3.2 cm). Wands that meet this new standard are marked with a silver battery cap. The Northwest Indian Fish Commission (NWIFC) conducted a field test of these newer wands on returning Chinook at three hatcheries in the fall of 2010. The study found high detection rates (99% for all samples combined) with just external wanding. In addition, some of the missed tags were detected with subsequent wanding in the mouth. The technique of "mouth wanding" (wanding the fish both externally on the snout and inside the mouth on the palate) is therefore still recommended with these wands.

Table 2-2. Proposed fishery sampling methods for tagged Coho Salmon in 2013.

| Region | Fishery | Type of Sampling | Comments |
|---|---|---|---|
| Alaska | Commercial | Visual | |
| | Sport | Visual | |
| Northern BC | Commercial | Electronic/Visual | Some terminal areas are not sampled. Freezer troll is sampled electronically; other catches are sampled visually. |
| | Sport | Visual (Voluntary) | Anglers are encouraged to turn in heads from marked Coho only; therefore, tag recoveries of unmarked Coho are not expected (fisheries are non-selective). |
| West Coast Vancouver Island | Commercial | Electronic | Incidental recoveries in fisheries on other species; non-retention of unmarked Coho. |
| | Sport | Visual (Voluntary) | Anglers are encouraged to turn in heads from marked Coho only; therefore, tag recoveries of unmarked Coho are not expected (fisheries are mostly mark-selective). |
| Strait of Georgia | Commercial | Electronic | Incidental recoveries in fisheries on other species; non-retention of unmarked Coho. |
| | Sport | Visual (Voluntary) | Anglers are encouraged to turn in heads from marked Coho only; therefore, tag recoveries of unmarked Coho are not expected (fisheries are mostly mark-selective). |
| Puget Sound | Commercial | Electronic | |
| | Sport | Electronic | |
| Washington Coast | Commercial | Electronic | |
| | Sport | Electronic | |
| Oregon Coast | Commercial | Electronic | The only commercial Coho fishery on the Oregon coast proposed to occur is North of Cape Falcon and is mark-selective; therefore, recoveries of unmarked Coho are not expected. |
| | Sport | Electronic | The ocean sport fishery is mark-selective except for a non-selective season during the first few weeks of September. Tag recoveries from unmarked Coho are anticipated in September. |
| Columbia River | Commercial | Electronic | |
| | Sport | Electronic | |
| California | Commercial | Visual | |
| | Sport | Visual | |

Table 2-3. Proposed fishery sampling methods for tagged Chinook Salmon in 2013.

| Region | Fishery | Type of Sampling | Comments |
|---|---|---|---|
| Alaska | Commercial<br>Sport | Visual<br>Visual | |
| Northern BC | Commercial<br><br><br>Sport | Electronic<br><br><br>Visual (Voluntary) | All Chinook are now electronically sampled and all tags are decoded (this has been the case since 2007).<br>Anglers are encouraged to turn in heads from marked Chinook only; therefore, tag recoveries of unmarked Chinook are not expected. |
| West Coast Vancouver Island | Commercial<br>Sport | Electronic<br>Visual (Voluntary) | Anglers are encouraged to turn in heads from marked Chinook only; therefore, tag recoveries of unmarked Chinook are not expected. |
| Strait of Georgia | Commercial<br>Sport | Electronic<br>Voluntary (Visual) | Anglers are encouraged to turn in heads from marked Chinook only; therefore, tag recoveries of unmarked Chinook are not expected. |
| Puget Sound | Commercial<br>Sport | Electronic<br>Electronic | |
| Washington Coast | Commercial<br>Sport | Electronic<br>Electronic | |
| Oregon Coast | Commercial<br>Sport | Electronic<br>Electronic | |
| Columbia River | Commercial<br><br><br><br>Sport | Electronic/Visual<br><br><br><br>Electronic/Visual | Spring and Summer Chinook fisheries are electronically sampled. Fall Chinook are visually sampled by Oregon. CWT recoveries from unmarked fall Chinook will be incomplete.<br>Spring and Summer Chinook fisheries are electronically sampled. Fall Chinook are visually sampled by Oregon. CWT recoveries from unmarked fall Chinook will be incomplete. The Buoy 10 fishery is electronically sampled. |
| California | Commercial<br>Sport | Visual<br>Visual | |

In November of 2011 Northwest Marine Technology (NMT) announced the availability of a "T-wand". T-wands are more sensitive than the previous wands with a detection range of 5.5 cm. Field tests indicate that for most Coho and Chinook, CWTs can be readily detected with a single quick up and down swipe on the top of the snout. However, for large fish, particularly male Chinook or Coho > 1 m in length, three up and down swipes on the snout are recommended - one down the middle and one on each side of the snout. The manufacturer believes that if used correctly, these wands should detect all tags. An advantage of these wands is that mouth wanding is not required on large Chinook. These wands are now being sold to agencies and ADFG, WDFW, and ODFW all purchased wands with 2012 Coded Wire Tag Improvement Funds.

### 2.4.2 Estimated Sampling Encounters

A summary of projected mass-marked Coho and Chinook salmon that may occur in agency CWT sampling programs is provided in Table 2-4.

**Coho Salmon**

Estimates of the number of mass-marked fish projected to be encountered in future CWT sampling programs for Coho Salmon that are mass marked in 2013 are much lower than the numbers projected for previous years and reflect a change in survival rates, exploitation rates, and sample rates of the new broods assessed, 2005–2007. Planned MM in 2013 will likely result in estimated future encounters of approximately 400 untagged and marked recoveries in AK and no encounters of untagged and marked Coho Salmon in CA – the two geographical areas where Coho are not mass marked or electronically sampled. It is also projected that approximately 3,000 untagged and mass-marked Coho recoveries will occur in Canadian fisheries, some of which are visually sampled.

**Chinook Salmon**

Like Coho, these estimates of the number of mass-marked fish projected to be encountered in future CWT sampling programs for Chinook Salmon mass marked in 2013 are lower in total than the numbers projected for previous years and reflect a change in survival rates, exploitation rates, and sample rates of the new broods assessed, 2003–2005. Planned MM of southern US Chinook stocks will result in estimated mass-marked encounters of approximately 9,300 Chinook in AK, 14,000 Chinook in Canada, and 1,300 Chinook in CA, assuming recent exploitation rates and sampling programs. We emphasize these regions because agencies in these areas rely partially or completely on visual sampling to recover CWTs (Table 2-3). For example, in Alaskan troll fisheries where visual sampling is employed, the proportion of marked Chinook Salmon encountered that is untagged has been much greater in recent years (Figure 2-3).

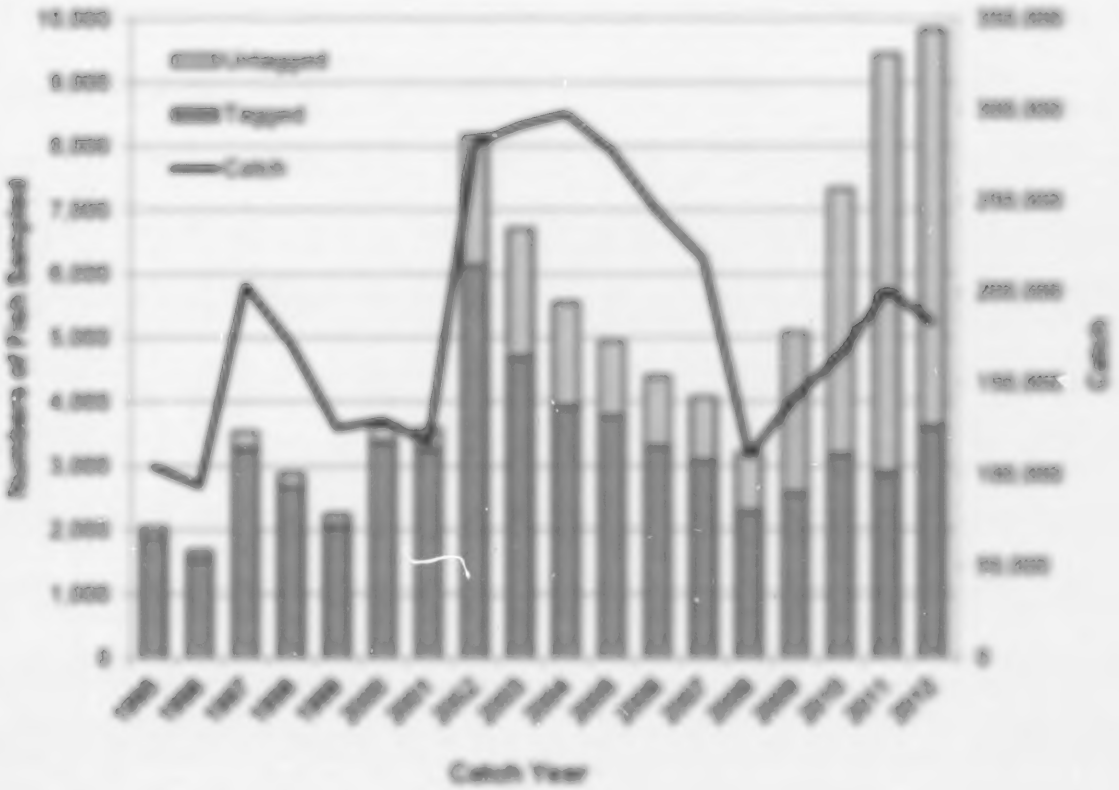


Figure 2-3. Numbers of marked Chinook Salmon sampled in Alaska's trawl fishery by unmarked and tagged status, with catch numbers, 1995–2012.

Table 3-4 Numbers of mass-marked Coho and Chinook projected to be encountered in future CWT sampling programs (actual number of fish encountered in samples will depend on survival rates, exploitation rates, and sampling rates). For this analysis, CWT recoveries from the following brood years were used: 2003–2007 for Coho and 2003–2005 for Chinook. Tribal hatchery mass-marked production in WA is included in the WDFW numbers.

| Species | Area/Run | Season | Agency | 2010 TAH | Estimated Encounters in Future Fishery Sampling Programs | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Alaska | | SBC | | NBC | | B.C. (CTC) | | Columbia R. | | SR Coast | | California | |
| | | | | | Exp. | Inc. | Exp. | Inc. | Exp. | Inc. | Exp. | Inc. | Exp. | Inc. | Exp. | Inc. | Exp. | Inc. |
| Coho | [illegible] | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | [illegible] | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | Puget Sound | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | WA Coast | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | OR Coast | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | Columbia River | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | Total | | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| Chinook | Puget Sound | Spring | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | Summer | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | Fall | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | WA Coast | Spr/Sum | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | Fall | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | OR Coast | S. Spr | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | S. Spr | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | Fall | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | Columbia River | Spring | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | Summer | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | Fall/Tule | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | Bright | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | Snake River | Fall | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | Spring | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | | [illegible] | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| | | Total | | [illegible] | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |

[illegible]

Table 3-1. Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for years 2003 through 2013

"P" indicates the MSF proposal was submitted to the PSC-SFEC by the requested deadline. "F" indicates the MSF was conducted. "R" indicates the post-season report summarizing MSF results was submitted successfully to the PSC-SFEC. An "O" (third character) indicates that the post-season MSF report is still outstanding (i.e., SFEC has not yet received the report). An "X" indicates that a MSF proposal was not submitted to SFEC (first character) or the MSF was not conducted (second character). Finally, "-" indicates the MSF was neither proposed nor conducted in a given year.

| Fishery Name (SFEC Proposal ID) | Catch Year[1] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 2003 | 2004 | 2005 | 2006[2] | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| *Targeting Method Other* | | | | | | | | | | | |
| Sport, Southern BC marine and freshwater (MSF-BOC-02) | PFR | PFR | PFR | PFR | PFO | PFO | PFO | PFO | PFO | PFO | P |
| PSC, Lower Fraser R. (MSF-BOC-03) | - | - | - | PFR | PFO | PFO | PFO | PFO | PFO | PFO | P |
| Commercial, Southern BC marine (MSF-BOC-05) | - | PX | PFR | PFR | XFO | PFO | PX | PFO | PFO | PFO | P |
| Sport, Lower Fraser R. (MSF-BOC-06) | XFR | XFR | XFR | PFR | PFO | PFO | PFO | PFO | PFO | PFO | P |
| Sport, Puget Sound Area 5-13 (MSF-WDFW-07) | XFR | PFR | PFR | PFR | XFR | PFR | PFR | PFR | PFR | PFR | P |
| Sport, Strait R. (MSF-WDFW-10) | XFO | XFO | XFO | XFO | XFO | PFR | PFO | PFO | - | - | |
| Sport, W. Juan Area 1-4 and Bays (MSF-WDFW-08) | PFR | PFR | PFR | PFR | XFR | PFR | PFR | PFR | PFR | PFR | P |
| Commercial, W. Juan Area 1-4 (MSF-WDFW-17) | XFO | XFO | XFO | XFO | XFO | PFO | PFO | PFO | PFO | PFO | P |
| Sport, Quillayute R. (MSF-WDFW-21) | XFO | XFO | XFO | XFO | XFO | XFO | XFO | XFO | PFO | PFO | P |
| Sport, Grays Harbor tributaries (MSF-WDFW-23) | XFO | XFO | XFO | XFO | XFO | XFO | XFO | PFO | PFO | PFO | P |
| Commercial, Grays Harbor Area 2C (MSF-WDFW-30) | - | - | - | - | - | - | XFO | XFO | PXO | - | - |
| Sport, Grays Harbor Area 2-2 (MSF-WDFW-22) | - | - | - | - | - | - | - | PFO | PFO | PFO | P |
| Sport, Willapa tributaries (MSF-WDFW-25) | XFO | XFO | XFO | XFO | XFO | XFO | XFO | PFO | PFO | PFO | P |
| Sport, Willapa Bay Area 2-1 (MSF-WDFW-28)[3] | - | - | - | - | - | - | - | PFO | PFO | PFO | P |
| Sport, Lower Columbia R. (MSF-ODFW-WDFW-09) | XFR | XFR | XFO | XFO | XFO | PFO | PFO | PFR | PFO | PFO | P |
| Commercial, Lower Columbia R. (Buoy 10 to Bonneville Rail) (MSF-ODFW-WDFW-06) | - | - | - | - | - | - | - | - | - | - | P |
| Sport, Oregon coast (MSF-ODFW-01) | XFR | XFR | XFO | XFO | XFO | XFO | XFO | PFR | PFR | PFR | P |

[1] Catch year 2002 was the first year SFEC received requested MSF proposals from agencies. Some Coho MSFs began as early as 1996.

[2] Summary of MSFs are available for many of these fisheries for catch years 2003–2009 in SFEC 2012 (http://www.psc.org/pubs/SFEC%2012-4.pdf)

[3] Area 2 September MSFs within the Willapa Bay are included in the MSF-WDFW-06.

Table 3-1. (Continued) Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for years 2003 through 2013.

| Fishery Name (SFEC Proposal ID) | Catch Year[1,2] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
| *Targeting Marked Chinook* | | | | | | | | | | | |
| Sport, Strait of Juan de Fuca subareas, BC (MSF-FOC-07) | - | - | - | - | - | XFO | PFO | PFR | PFO | PFO | P |
| Sport, WCVI subareas, mainly inside (MSF-FOC-08) | - | - | - | - | - | - | PX | - | PX | - | - |
| Sport, Puget Sound Areas 5&6, summer (MSF-WDFW-02) | PFR | PFR | PFR | PFR | PFR | PFR | PFR | PFR | PFR | - | - |
| Sport, Puget Sound Areas 9-13, summer (MSF-WDFW-11) | - | - | - | - | PFR | PFR | PFR | PFR | PFR | - | - |
| Sport, Puget Sound Areas 5-13, summer (MSF-WDFW-35; combines proposals 02 and 11 as of 2012) | - | - | - | - | - | - | - | - | - | PFR | P |
| Sport, Puget Sound Areas 5-13, winter (MSF-WDFW-36; replaces 16 as of 2012; old proposal 08 [Area 8-1/8-2 Winter MSF] combined into 16 in 2007) | - | - | PFR | PFR | PFR | PFR | PFR | PFR | PFR | PFR | P |
| Sport, Nooksack R (fall run) (MSF-WDFW-13) | - | PFO | PFO | PFO | PFO | PFO | PFR | PFR | PFO | PFO | P |
| Sport, Upper Skagit R (spring run) (MSF-WDFW-12) | - | - | XFO | XFO | PFO | PFO | PFO | PFR | PFO | PFO | P |
| Sport, Skykomish R (summer run) (MSF-WDFW-01) | PFO | PFO | XFO | XFO | PFO | PFO | PFR | PFR | PFO | PFO | P |
| Sport, Snohomish R (summer run) (MSF-WDFW-37) | - | - | - | - | - | - | - | - | - | - | P |
| Sport, Carbon & Puyallup R (fall run) (MSF-WDFW-09) | XFO | XFO | PFO | PFO | PFO | PFO | PFO | PFO | PFO | PFO | P |
| Sport, Nisqually R (fall run) (MSF-WDFW-14) | - | - | XFO | XFO | PFO | PFO | PFO | PFO | PFO | PFO | P |
| Sport, Skokomish R (fall run) (MSF-WDFW-20) | - | - | - | - | - | - | PX | PFO | PFO | PFO | P |
| Sport, WA areas 1-4 (MSF-WDFW-19) | - | - | - | - | - | - | PX | PFR | PFR | PFR | P |
| Troll, WA areas 1-4 (MSF-WDFW-21) | - | - | - | - | - | - | PX | PX | - | - | - |
| Sport, Quillayute R (spring/summer run) (MSF-WDFW-32) | XFO | XFO | XFO | XFO | XFO | XFO | XFO | XFO | PFO | PFO | P |
| Sport, Hoh R (MSF-WDFW-33) | - | - | - | - | - | XFO | XFO | XFO | PFO | PFO | P |
| Commercial, Grays Harbor areas 2A,2B,2C,2D (MSF-WDFW-38) | - | - | - | - | - | - | - | - | - | - | P |
| Commercial, Willapa Bay (MSF-WDFW-25) | - | - | - | - | - | - | - | PFO | PFO | PFO | P |
| Sport, Willapa Bay Area 2.1 (MSF-WDFW-26) | - | - | - | - | - | - | - | PFO | PFO | PFO | P |
| Sport, Willapa Bay tributaries (fall run) (MSF-WDFW-27) | - | - | - | - | - | - | - | PFO | PFO | PFO | P |

[1] Catch year 2003 was the first year SFEC received requested MSF proposals from agencies. Some Coho MSFs began as early as 1998.
[2] Summary of MSFs are available for many of these fisheries for catch years 2005-2009 in SFEC 2012 (http://www.psc.org/pubs/SFEC12-1.pdf)

Table 3-1. (Continued) Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for years 2003 through 2013.

| Fishery Name (SFEC Proposal ID) | Catch Year[1,2] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
| ***Targeting Marked Chinook (continued)*** | | | | | | | | | | | |
| Sport, Lower Grand Ronde R (spring run) (MSF-WDFW-39) | - | - | - | - | - | - | - | - | - | - | P |
| Sport, Yakima R (spring run) (MSF-WDFW-03) | - | PFO | - | - | - | PFR | PX | PFR | PFO | PFO | P |
| Sport, Snake R (fall run) (MSF-IDFG-04) | - | - | - | - | - | - | XFO | XFO | XFO | PFO | - |
| Sport, Snake R (spring run) (MSF-WDFW-28) | - | - | - | - | - | - | - | PFO | PFO | PFO | P |
| Sport, Lower Snake R (fall run) (MSF-WDFW-05) | - | - | - | - | - | XFO | PFR | PFO | PFO | PFO | P |
| Sport, Lower Columbia R (spring run) (MSF-ODFW/WDFW-01) | PFO | PFO | PFO | XFO | XFO | PFO | PFR | PFO | PFO | PFO | P |
| Sport, Columbia R (summer run) (MSF-ODFW/WDFW-02) | PFO | PFO | PX | XFO | - | PFO | PX | PFO | PFO | PFO | P |
| Commercial, Lower Columbia R (spring run) (MSF-ODFW/WDFW-03) | PFO | PFO | PFO | XFO | XFO | PFO | PFR | PFO | PFO | PFO | P |
| Sport, Columbia R (fall run) (MSF-ODFW/WDFW-05) | - | - | - | - | - | - | PX | PX | PFO | PFO | P |
| Commercial, Lower Columbia R (Buoy 10 to Beacon Rock) (MSF-ODFW/WDFW-07) | - | - | - | - | - | - | - | - | - | - | P |
| Sport, Willamette R (spring run) (MSF-ODFW-01) | PFR | PFR | PFO | PFO | XFO | PFR | PFR | PFR | PFO | PFO | P |
| Sport, Oregon coast (fall run) (MSF-ODFW-02) | - | - | - | - | - | XFO | PFO | PFR | PFR | PFR | P |

[1] Catch year 2003 was the first year SFEC received requested MSF proposals from agencies. Some Coho MSFs began as early as 1998.
[2] Summary of MSFs are available for many of these fisheries for catch years 2005–2009 in SFEC 2012 (http://www.psc.org/pubs/SFEC12-1.pdf)

## *3.2 SFEC's New Approach for Evaluating MSF Proposals*

The SFEC-AWG employs a two-stage approach to summarize the results of its evaluation of MSF proposals. First, each proposal is characterized in regard to the following eight categories (Table 3-2):

1) Fishery regulation
2) CWT sampling method
3) CWT detection method
4) CWT composition estimation method
5) Alignment of time/area strata boundaries of regulations and catch estimation and CWT sampling programs
6) Catch estimation by size/mark/retention status
7) Indicator stocks expected to be impacted by the fishery
8) DIT release groups expected to be impacted by the fishery

Alternative characteristics for each category are listed by codes and described in Table 3-2. For example, Table 3-2 lists three possible characteristics for the first category (Fishery Regulation) including "MSF", "Mark-mixed bag", and "Mark and size-mixed bag".

Second, each MSF proposal is assigned a Green-Yellow-Red level of concern for each characteristic (green- no concern, yellow- moderate concern, red- major concern). Table 3-3 presents the results of the evaluation. Each colored cell contains codes referencing the descriptions of characteristics provided in Table 3-2. For instance, if a particular proposal involved a Mark-mixed bag fishery, then for the category Fishery Regulation, the numeric index for that characteristic (2) was entered in the column labeled Fishery Regulation. Further, since Mark-mixed bag fisheries generally pose challenges for estimation of fishery impacts, the cell would be colored yellow or red, the chosen color depending on other qualifiers such as the magnitude of the fishery. Table 3-3 also includes narrative columns to provide additional information regarding the nature of concerns identified by SFEC.

Table 3-2. List of characteristics that describe proposed MSFs, organized by Subject Category. This table is used as a reference table by Table 3-3.

| Subject Category | Characteristic | How the Characteristic Influences Evaluation of MSF Impacts | Concern for Evaluation of Fishery Impacts on Indicator Stocks |
|---|---|---|---|
| Fishery Regulation: mark-bag limit type | 1) MSF (i.e., for mark-selective species, only marked fish can be retained) | The regulation influences what method needs to be used to estimate mortalities by size and mark status | Note that SFEC has not been able to develop direct means to allocate non-landed mortalities under mixed-bag regulations |
| | 2) Mark-mixed bag limit (i.e., for mark-selective species, a portion of total bag limit can be unmarked) | | |
| | 3) Mark and size-mixed bag limit (size-range-specific allowances for retention of unmarked fish) | | |
| CWT Sampling Method | 1) Direct sample in creel surveys and dockside sampling programs. | Direct sampling programs are statistically designed programs in which technicians collect information. | If sample expansions are not available due to lack of total catch estimates in direct sampling no estimate of CWTs recovered by fishery can be made. |
| | 2) Voluntary Recovery Program - fishers submit heads, e.g., in BC sport fishers send in heads from clipped fish. | For the voluntary recovery program it is necessary to estimate the total CWT recoveries from an estimated submission rate. | Submission rate estimation depends on a catch estimation program that estimates total clipped catch. If this is unavailable, submission rates from other areas or periods have to be used, potentially biasing estimates of CWT recoveries. |
| | 3) No CWT sampling | Proxy will be needed. | |

Table 3-2. *(Continued) List of characteristics that describe proposed MSFs, organized by Subject Category. This table is used as a reference table by Table 3-3.*

| Subject Category | Characteristic | How the Characteristic Influences Evaluation of MSF Impacts | Concern for Evaluation of Fishery Impacts on Indicator Stocks |
|---|---|---|---|
| CWT Detection Method | (1) Electronic detection will be implemented. All fish (marked and unmarked) will be checked for CWT using electronic gear (wands, tube detectors) | Electronic detection will result in recoveries of all tagged fish in the sample, both unclipped and clipped | |
| | (2) Visual detection will be implemented. All adipose fin-clipped (marked) fish in sample are checked for tags, but unmarked fish in the sample are not | Visual detection results in recoveries of tagged and marked fish only. Any unmarked and tagged fish will not be detected | Unmarked and tagged fish in the fishery will not be sampled and estimates of total CWT recoveries will be biased (Without recoveries of both unmarked but tagged SHT and conservation groups) |
| CWT Composition Estimation Method | (1) Standard method using CWTs sampled from fishery | Estimates of CWT recoveries in fisheries and escapement are used for cohort analyses, estimation of exploitation rates and other stock parameters | |
| | (2) Non-standard or indirect, using CWT rates from proxy (i.e., hatchery or fishery), where relationship has been established | | If estimates of total CWT recoveries are biased all CWT based estimates will also be biased |
| | (3) Non-standard or indirect, with poorly or unestablished proxy | | |
| | (4) None proposed | | If no CWT estimates are made all CWT based estimates will be biased |

Table 1-1 (Continued) List of characteristics that describe proposed NMPA, organized by Subject Category. This table is used as a reference table in Table 1-2.

| Subject Category | Characteristic | Key Use Characteristic Differences in Evaluation of NMP Targets | Proposed Use for Evaluation of Effects Against Subject Characteristics |
|---|---|---|---|
| Organisms of [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |

Table 3-2 (Continued) List of characteristics that describe proposed MSFs, organized by Subject Category. This table is used as a reference table by Table 3-3.

| Subject Category | Characteristic | How the Characteristic Influences Evaluation of MSF Impacts | Concern for Evaluation of Fishery Impacts on Indicator Stocks |
|---|---|---|---|
| Are CWT indicator stocks expected to be impacted in the fishery? | 1) No, CWT indicator stocks are not expected. | Estimate anticipated stock-age-specific encounters of coded-wire-tagged fish in the fishery. Determine potential significance of MSF to indicator stocks. | Lack of information to determine potential significance of MSF to indicator stocks. |
| | 2) Yes, CWT indicator stocks are expected, and a complete list of indicator stocks was provided. | | |
| | 3) Yes, CWT indicator stocks are expected, and an incomplete list of indicator stocks was provided. | | |
| | 4) Yes, CWT indicator stocks are expected, but a list of indicator stocks was not provided. | | |
| Are double-index-tagged (DIT) fish expected to be impacted in the fishery? | 1) No, DIT stocks are not expected. | Estimate anticipated stock-age-specific encounters of DIT fish in the fishery. Determine potential significance of MSF to DIT stocks. | Lack of information to determine potential significance of MSF to DIT indicator stocks. |
| | 2) Yes, DIT stocks are expected, and a complete list of DIT stocks was provided. | | |
| | 3) Yes, DIT stocks are expected, and an incomplete list of DIT stocks was provided. | | |
| | 4) Yes, DIT stocks are expected, but a list of DIT stocks was not provided. | | |

Table 3-3. Summary of SFEC's evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (see Table 3-2 for definitions of numeric codes).

Color coding key:

| | |
|---|---|
| # | Of least concern to SFEC as an issue in the MSF proposal |
| # | Of moderate concern to SFEC as an issue in the MSF proposal |
| # | Of most concern to SFEC as an issue in the MSF proposal |

| Proposal ID | Location | Fishery Type | Regulations | CWT Sampling Method | CWT Detection Method | CWT Composition Estimation Method | Alignment | Catch Estimation | Indicator Stocks | DIT Stocks | Comments and Concerns | Methods of Estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Coho Salmon* | | | | | | | | | | | | |
| MSF-FOC-02 | BC Management Areas 11-29, outer areas of 121-127. | Pre-terminal and Terminal Recreational (MSF) | 1 | 2 | 2 | 1 | 2 | 2,4 | 1 | 1 | Voluntary recovery program will not provide recoveries of unmarked and tagged fish in any fishery. Low CWT submission rates. | Total catch using creel surveys in some areas and times and log books from lodges. No catch estimate for area/times with no creel or lodge logbook |
| MSF-FOC-02 | BC Management Areas 11-29 | Terminal Recreational, (Mixed Bag) | 2 | 2 | 2 | 1 | 2 | 2,4 | 1 | 1 | Voluntary recovery program will not provide recoveries of unmarked and tagged fish in any fishery. Low CWT submission rates. | Total catch using creel surveys in some areas and times and log books from lodges. No catch estimate for area/times with no creel or lodge logbook |
| MSF-FOC-03 | Lower Fraser River | Terminal, First Nations (Mixed Bag) | 1 | 3 | 2 | 4 | 1 | 2 | 1 | 0,1 | This fishery is mixed bag because unmarked Coho that are mortally wounded or dead can be retained. Low CWT submission rates. Numbers of ad-clipped and unclipped Coho are reported in some fisheries. | Total catch estimate using creel survey or census. |
| MSF-FOC-05 | BC Management Areas 23-27, 121-127 | Pre-terminal Commercial (MSF) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | Total catch is from fisher reported log books and phone-in catch reports. |

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (see Table 3-2 for definitions of numeric codes).

| Proposal ID | Location | Fishery Type | Regulations | CWT Sampling Method | CWT Detection Method | CWT Composition Estimation Method | Alignment | Catch Estimation | Indicator Stocks | DIT Stocks | Comments and Concerns | Methods of Estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Coho Salmon (continued)*** | | | | | | | | | | | | |
| MSF-FOC-06 | Lower Fraser River | Terminal Recreational (MSF) | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 0,1 | Voluntary submission of samples from clipped fish, but fishery is fully mark selective. Creel surveys and awareness factors for some times and areas. | Catch estimates from creel surveys. CWT estimation for areas/times with no catch estimation program relies on submission rates in other strata. |
| MSF-WDFW-06 | Ocean Areas 1-4 & Col R Buoy 10 | Recreational | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | Catch estimate from creel surveys, based on an effort/CPUE survey with boat exit counts and exit interviews. Stratified by boat type (private or charter boats) and day type (weekend or weekdays). On-water encounter rates and mark rates obtained from charter ride-along trips and voluntary trip reports (VTRs). |
| MSF-WDFW-07 | Puget Sound Areas 5-13 | Recreational | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | Total catch estimates from CRCs, and creel surveys in some areas. On-water encounter rates and mark rates obtained from VTRs and dockside samplers. |
| MSF-WDFW-15 | Ocean Areas 1-4 | Commercial Troll | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | No estimates of encounters or mark rate. | Catch estimates from fish tickets. |

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (see Table 3-2 for definitions of numeric codes).

| Proposal ID | Location | Fishery Type | Regulations | CWT Sampling Method | CWT Detection Method | CWT Composition Estimation Method | Alignment | Catch Estimation | Indicator Stocks | DIT Stocks | Comments and Concerns | Methods of Estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Coho Salmon (continued)* | | | | | | | | | | | | |
| MSF-WDFW-22 | Willapa tributaries (North, Smith, Willapa, Niawiakum, Palix, Nemah, Naselle, Bear) | Recreational | 3 | 1,3 | 1 | 3 | 2 | 2 | 1 | 1 | There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Dockside sampling for CWTs in September only; therefore, CWT sampling and estimation is not uniform across fishery regulation period. | Total catch is estimated using CRCs. Mark rates obtained from estimates of total escapement. CWT estimates depend on tag ratios and total escapement estimate. |
| MSF-WDFW-23 | Grays Harbor, Marine Area 2.2 | Recreational | 3 | 1,3 | 1 | 3 | 2 | 2 | 1 | 1 | There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Dockside biological sampling Sept-Oct but none in Nov-Jan. CRC for effort estimates. | Total catch is estimated from CRCs. Estimate mark rate from VTRs and commercial fishery. CWT estimates depend on tag ratios from commercial fishery. |
| MSF-WDFW-24 | Grays Harbor tributaries (Chehalis, Elk, Hoquiam, Humptulips, Johns, Newaukum, Satsop, Wynoochee, Skookumchuch, Van Winkle, Wishkah, Quigg Lake) | Recreational | 3 | 3 | 1 | 3 | 2 | 2 | 1 | 1 | There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Some direct sampling in Lower Chehalis only; indirect CWT sampling via electronic sampling of escapement. | Total catch is estimated using CRCs. Mark rates obtained from estimates of total escapement. CWT estimates depend on tag ratios and total escapement estimates. |

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook MSF's proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (see Table 3-2 for definitions of numeric codes).

| Proposal ID | Location | Fishery Type | Regulations | CWT Sampling Method | CWT Recovery Method | CWT Composition Estimation Method | Algorithm | Catch Estimation | Sufficient Stocks | MT Stocks | Comments and Concerns | Methods of Estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coho Salmon (continued) | | | | | | | | | | | | |
| MSF-WDFW-29 | Willapa Bay, Marine Area 2 1 | Recreational | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | There will be a problem in estimating CWT composition of mortalities due to mark and size restricting regulation. | Angler surveys and CWTs to get mark rate and although proportion. Direct electronic sampling for CWTs. |
| MSF-WDFW-31 | Quillayute & tributaries (Sugarloaf, Calawah, Dickey, Quillayute, Sol Duc) | Recreational | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | There will be a problem in estimating CWT composition of mortalities due to mark and size restricting regulation. Lack of direct sampling, annual CWT composition from electronic sampling is what an fishery is used. | Total catch estimated using CWTs. Mark rate estimates obtained from commercial fishery. |
| MSF-ODFW / WDFW-04 | Columbia R. Mouth upstream to Hood R. Bridge, includes Buoy 10 | Recreational | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | Creel survey and CWTs provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Observed mark rates at Bonneville Dam for upriver stocks. |
| MSF-ODFW / WDFW-06 | Lower Columbia River (Buoy 10 upstream to Beacon Rock) | Commercial | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | Caught Not, non fishery. | Potential for random on-board monitoring. Biological sampling of landed catch at processing plants. Release mortality rate 5%. |

Table 3-1 [illegible]

| Proposal ID | Innovation | Primary Type | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | Comments and Concerns | Methods of Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cable Television Franchises** | | | | | | | | | | | | |
| [illegible] | [illegible] | Noncontroversial | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | [illegible] | [illegible] |
| **Network Reform** | | | | | | | | | | | | |
| [illegible] | [illegible] | Pre-screened Noncontroversial (Should Pass) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | [illegible] | [illegible] |
| [illegible] | [illegible] | Noncontroversial | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | [illegible] | [illegible] |
| [illegible] | [illegible] | Noncontroversial | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | [illegible] | [illegible] |
| [illegible] | [illegible] | Noncontroversial | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | [illegible] |

[illegible]

Table 3-3 (Continued) Summary of SFEC's evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (see Table 3-2 for definitions of numeric codes)

| Proposal ID | Location | Fishery Type | Regulations | CWT Sampling Method | CWT Recovery Method | CWT Composition Estimation Method | Shipment | Catch Estimation | Indicator Stocks | DIT Stocks | Comments and Concerns | Methods of Estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Chinook Salmon (continued)* | | | | | | | | | | | | |
| MSF-WDFW-19 | Ocean from 3-0 | Recreational | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | Catch estimate from creel survey, based on an effort/CPUE survey with boat exit counts and exit interviews. Stratified by boat type (private or charter boats) and day type (weekend or weekdays). On-water encounter rates (by mark status/size) obtained from charter rule-along trips and VTRs. |
| MSF-WDFW-20 | Skokomish River | Recreational | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | Creel surveys were conducted for 3 years but are no longer funded. CWT sampling is conducted in the Skokomish MSF. As this is an indicator and a DIT program, it is recommended that CWT sampling continue, even if the creel survey for total estimates is not implemented. | Catch estimates from CRC. |
| MSF-WDFW-21 | Willapa Bay (26, 26B,26C, 28B, 29, 2E) – (new area designations for 2A, 3A, 2J, 2K, and 2M) | Commercial | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Live boxes are used and the condition of released unmarked and marked Chinook and Coho are recorded. | Catch from fish tickets. Standard CWT estimates. |
| MSF-WDFW-22 | Willapa Bay 2A/2J | Recreational | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | There will be a problem in estimating CWT composition of mortalities due to mark and size-selective bag regulation. There is a mismatch between fishery regulation and sampling/catch estimation strata boundaries. | Catch estimates from CRC's. Angler surveys provide data needed to estimate CWT ratios and mark rates; additionally, VTRs provide data to estimate size/mark status of encounters. |

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (see Table 3-2 for definitions of numeric codes).

| Proposal ID | Location | Fishery Type | Regulations | CWT Sampling Method | CWT Detection Method | CWT Composition Estimation Method | Alignment | Catch Estimation | Indicator Stocks | DIT Stocks | Comments and Concerns | Methods of Estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Chinook Salmon (continued)* | | | | | | | | | | | | |
| MSF-WDFW-27 | Willapa Tributaries (Willapa, Niawiakum, Palix, Nemah, Naselle, Bear) | Recreational | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. | Catch estimates from CRC. Mark rates and tag ratios from hatchery and spawning ground data. |
| MSF-WDFW-28 | Lower Snake R (spring) | Recreational | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | Catch and mark rate estimated using creel survey. Sampling for CWTs using electronic tag detection; standard CWT estimation methods. |
| MSF-WDFW-32 | Quillayute River system (Bogachiel, Calawah, Dickey, Quillayute, and Sol Duc) | Recreational | 3 | 3 | 1 | 3 | 3 | 2 | 0 | 0 | There will be a problem in estimating CWT composition of mortalities due to mark and size mixed bag regulation. Estimates of CWTs are made using hatchery and tribal net estimates of CWT composition. There are no data evaluating this method for the coastal fisheries. | Catch estimates from CRC. CWT ratios and mark rates from tribal net fishery. |
| MSF-WDFW-33 | Hoh River system | Recreational | 3 | 3 | 1 | 3 | 3 | 2 | 0 | 0 | There will be a problem in estimating CWT composition of mortalities due to mark and size mixed bag regulation. Estimates of CWTs are made using hatchery and tribal net estimates of CWT composition. There are no data evaluating this method for the coastal fisheries. | Catch estimates from CRC. CWT ratios and mark rates from tribal net fishery. |

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (see Table 3-2 for definitions of numeric codes).

| Proposal ID | Location | Fishery Type | Regulations | CWT Sampling Method | CWT Detection Method | CWT Composition Estimation Method | Alignment | Catch Estimation | Indicator Stocks | DIT Stocks | Comments and Concerns | Methods of Estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Chinook Salmon (continued)*** | | | | | | | | | | | | |
| MSF-WDFW-35 | All Puget Sound Areas 5–13 (summer) | Recreational | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | Total catch estimates from creel surveys and CRCs. On-water Chinook encounter rates, estimated via test fisheries and/or VTRs, provide estimates of encounters by size and mark status. |
| MSF-WDFW-36 | All Puget Sound Areas 5–13 (winter) | Recreational | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | Total catch estimates from creel surveys and CRCs. On-water Chinook encounter rates, estimated via test fisheries and/or VTRs, provide estimates of encounters by size and mark status. |
| MSF-WDFW-37 | Snohomish River (mouth to confluence of Skykomish and Snoqualmie rivers, including all channels.) | Recreational | 1 | 3 | 1 | 3 | 1 | 1 | 1 | 1 | Lack of direct sampling; only indirect CWT estimates, via electronic sampling at hatchery. No study indicating quality of proxy. | Creel surveys will estimate releases by size and mark status. |
| MSF-WDFW-38 | Grays Harbor 2A, 2B, 2C, 2D | Commercial | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Live boxes are used and the condition of released unmarked and marked Chinook and Coho are recorded. | Catch from fish tickets. Standard CWT estimates. |
| MSF-WDFW-39 | Lower Grande Ronde R | Recreational | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | | Catch and mark rate estimated using creel survey. Sampling for CWTs using electronic tag detection; standard CWT estimation methods. |

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (see Table 3-2 for definitions of numeric codes).

| Proposal ID | Location | Fishery Type | Regulations | CWT Sampling Method | CWT Detection Method | CWT Composition Estimation Method | Alignment | Catch Estimation | Indicator Stocks | DIT Stocks | Comments and Concerns | Methods of Estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Chinook Salmon (continued)*** | | | | | | | | | | | | |
| MSF-ODFW / WDFW-01 | Columbia R. Mouth upstream to McNary Dam, and Ringold Hatchery Area | Recreational | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | There is no information on whether and how release number, mark, and size status will be obtained. | Creel survey and CRC provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery. |
| MSF-ODFW / WDFW-02 | Columbia R. Mouth upstream to Chief Joseph Dam | Recreational | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | Creel census below McNary does not cover the whole fishery, which extends to Priest Rapids; therefore, effort estimate will be underestimated. There is no information on whether and how release number, mark, and size status will be obtained. | Creel survey and CRC provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery. |
| MSF-ODFW / WDFW-03 | Columbia R. Mouth upstream to Bonneville Dam | Commercial Gillnet / Tanglenet | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | Spring Chinook | Catch from fish tickets. Biological sampling of landed catch at processing plants, plus random on-board monitoring. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery. |

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook MSF's proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (see Table 3-2 for definitions of numeric codes).

| Proposal ID | Location | Fishery Type | Acquisition | CWT Sampling Method | CWT Detection Method | CWT Composition Estimation Method | Absence | Catch Estimation | Indicator Stocks | MIT Stocks | Comments and Concerns | Methods of Estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chinook Salmon (continued) | | | | | | | | | | | | |
| MSF-CEIFW / WDFW-05 | Columbia R. Mouth upstream to McNary Dam, includes Buoy 10 | Recreational | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | Have a no information on whether and how release number, mark and race status will be obtained. Fall Chinook are generally visually sampled by ODFW. | Creel survey and CRC provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery. |
| MSF-CEIFW / WDFW-07 | Lower Columbia River (Buoy 10 upstream to Pierces Rock) | Commercial | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | Limited to beach and purse seines. Exact specifics to be determined. The original ID of this proposal was MSF-CEIFW-04. | Potential for random on-board monitoring. Biological sampling of landed catch at processing plants. Release mortality rate 5%. |
| MSF-CEIFW-01 | Willamette River | Recreational | 2 | 3 | 1 | 3 | 3 | 3 | 1 | 1 | Problems due to mixed bag fin- size, lack of information in creel survey downstream where releases are reported for adults, jacks, unMod and unmarked combined, no sampling of harvest upstream. Punch cards do not require recording of jacks or release. Therefore, encounters by size and mark status cannot be estimated for either location (above or upstream). | Catch estimates from creel/angler interviews downstream of Willamette Falls; catch record cards used upstream of the falls. Upstream estimates of mark rate, jacks and adults calculated from window counts. |
| MSF-CEIFW-02 | Elsewe Terminal area (within 3 miles of the river mouth): Tillamook, EB, and Clatsop | Recreational | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | Mark and non-mixed bag regulations present problems in estimating CWT mortalities. Not able to separate terminal Chinook fishery catch from non-terminal ocean fishery. Fishery proposed for several years but not implemented. | All fish landed/sampled as one stratum. Angler recall of released fish used to determine mark rate; no sublegal estimates. |

## 3.3 Expected Encounters of CWT Indicator Stocks in MSFs

Multiple MSFs are expected to occur during 2012 in SE, W-V, and NB. Table 3-4 and Table 3-5 were constructed using historical information on encounters of tagged and marked fish in (stock) tagged stocks of Columbia River origin (MU) (NB, Table 3-16 and Chinook catch years 2006–10, Table 3-17) that can be expected to be encountered in these areas with MSFs.

Tagged Columbia River stocks expected to be encountered are included in Table 3-6, all of which are used by the CWT for their analyses. Mark selective fisheries in Puget Sound (PS) and Strait of Juan de Fuca (SJDF), throughout southern BC, and W-V and NB created areas.

In 2007, there were 12 Chinook MSFs that occurred and they were largely restricted to PS and to the Columbia River with spring Chinook as the targeted group. Since then, Chinook MSFs have expanded substantially to marine and freshwater areas, with the number of Chinook MSFs more than doubling to 27 (Table 3-1). From 2010 to 2012, additional Chinook MSFs occurred and have been proposed in the marine waters of NB, PS, W-V, creek areas, and freshwater areas in PS and Columbia River. Further, Chinook MSFs that target take-out fish have been added. Prior to 2008, the indicator stocks encountered in MSFs were largely of PS origin or were Columbia River spring stocks. With the additional fisheries now proposed for Canadian waters, W-V, creek areas, and Columbia River, a larger number of indicator stocks (as Stock 1) is encountered in MSFs (Table 3-1). In addition, MSFs have expanded substantially in PS, both geographically and temporally, with concomitant increases in catch in MSFs for Chinook Salmon (Figure 3-1).

In order to monitor the impacts of these expanding MSFs, Chinook CWT programs must be expanded to represent the new stocks that will be encountered. Typically, fisheries have been discontinuing rather than expanding their CWT programs. Agencies should reevaluate their CWT programs and consider expanding CWT groups and discontinuing the programs. The CTC is now struggling to analyze the fishing mortalities attributed to Chinook MSFs because more CWT groups are needed.

Table 1-1 Number of logged and resolved Life Histories sampled (Effort) and estimate of total estimated logs incorporated for the sample years in California or in management coverages over the ten years (2001–2010). Values estimated are based on the data on years of Life Histories were resolved, years not logged or off years. Life Histories accomplishments are not available in Pre-Regional Need Administrative Process (RNAP) database for RF, Alaska, Hawaiian, percentages shown for RF are only for Kaibab Association.

| Region | Number Stations Available | # Life Histories Logged | Base Harvest Regions | | | | | | | | Secondary Harvest | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | RF | | Pacific Coastal Fir | | Coastal Redwood | | Mixed Conifer | | Hardwood | | Hardwood | | Hardwood | | Hardwood | |
| | | | Effort | Est. | Effort | Est. | Effort | Est. | Effort | Est. | Effort | Est. | Effort | Est. | Effort | Est. | Effort | Est. |
| R1 | Boise Cascade | | | | | | | | | | | | | | | | | |
| | Potlatch | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | Plumas Pine | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | Sierra Pine | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | Sierra Pacific | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| R2 | Weyerhaeuser | | | | | | | | | | | | | | | | | |
| | Crown Pacific | | | | | | | | | | | | | | | | | |
| | Stimson | | | | | | | | | | | | | | | | | |
| R3 | Boise Cascade | | | | | | | | | | | | | | | | | |
| | Rayonier | | | | | | | | | | | | | | | | | |
| | Rayonier Timber | | | | | | | | | | | | | | | | | |
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Table 3-6. (Continued) Number of tagged and marked Coho Salmon sampled (Obs) and percent of total estimated tags (expanded for the sample rate) in fisheries or in escapement, averaged over brood years 2003–2008.

| Region | | Hatchery / Release Location | # Years Tagged | Mark-Selective Fisheries | | | | | | | | | | Non-Selective Fisheries | | | | Escapement | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | BC | | Puget Sound | | WA Coast | | Columbia R | | OR Coast | | Commercial | | Sport | | | | | |
| | | | | Obs | % of Est | Obs | % of Est | Obs | % of Est | Obs | % of Est | Obs | % of Est | Obs | % of Est | Obs | % of Est | Obs | % of Est | Obs | Est |
| W.St. | Puget Sound South | Minter Creek H | 2 | 2 | 4% | 2 | 4% | 0 | 4% | - | - | 1 | <1% | 30 | 28% | 4 | 4% | 106 | 55% | 230 | 337 |
| | | Clear Creek H | 1 | 25 | 16% | 25 | 4% | 5 | 2% | - | - | - | - | 90 | 6.5% | 2 | 2% | 19 | 10% | 90 | 188 |
| | | Kalama Creek H | 6 | 0 | 3% | 5 | 9% | 5 | 2% | - | - | 1 | <1% | 43 | 30% | 5 | 7% | 122 | 40% | 179 | 311 |
| | | South Sound Net Pens | 6 | 4 | 4% | 14 | 5% | 13 | 4% | - | - | 1 | <1% | 211 | 79% | 10 | 8% | 2 | <1% | 257 | 364 |
| | Hood Canal | George Adams H | 6 | 8 | 5% | 9 | 3% | 13 | 3% | - | - | 1 | <1% | 74 | 23% | 9 | 4% | 662 | 63% | 771 | 1,204 |
| | | Quilcene Bay Net Pen | 6 | 10 | 5% | 25 | 4% | 21 | 2% | - | - | 2 | <1% | 219 | 52% | 14 | 5% | 425 | 38% | 713 | 1,061 |
| | | Quilcene NFH | 6 | 6 | 4% | 20 | 4% | 17 | 3% | - | - | 2 | <1% | 186 | 53% | 7 | 4% | 375 | 38% | 613 | 1,001 |
| | | Port Gamble Bay Pens | 6 | 4 | 6% | 15 | 7% | 11 | 4% | - | - | 1 | <1% | 125 | 76% | 7 | 6% | 11 | 2% | 169 | 450 |
| | N. WA Coast | Nitinat NFH | 6 | 3 | 5% | 3 | 1% | 22 | 6% | - | - | 4 | 2% | 20 | 5% | 2 | 1% | 300 | 84% | 356 | 964 |
| | | Quinault NFH | 6 | 8 | 2% | 5 | <1% | 120 | 6% | - | - | 27 | 2% | 600 | 55% | 1 | <1% | 475 | 37% | 1,240 | 4,632 |
| | | Salmon R Fish Culture | 6 | 2 | 1% | 2 | <1% | 30 | 9% | - | - | 12 | 2% | 263 | 57% | 1 | <1% | 204 | 31% | 534 | 1,373 |
| | | Sekiu H | 6 | 9 | 5% | 5 | 1% | 124 | 10% | - | - | 30 | 5% | 63 | 6% | 6 | 1% | 1,206 | 76% | 1,440 | 2,796 |
| | Grays Harbor | Bingham Creek H | 6 | 2 | 1% | 0 | <1% | 40 | 5% | - | - | 7 | 1% | 58 | 7% | 12 | 3% | 930 | 83% | 1,052 | 2,362 |
| | | Friends Landing NP | 5 | 6 | 2% | 0 | <1% | 40 | 17% | - | - | 6 | 2% | 102 | 51% | 16 | 10% | 124 | 18% | 304 | 948 |
| | | Satsop Springs Ponds | 5 | <1 | 1% | 0 | 1% | 8 | 5% | - | - | 5 | 2% | 11 | 8% | 2 | 1% | 204 | 78% | 234 | 402 |
| | | Humptulips H | 1 | 3 | 2% | 0 | <1% | 53 | 13% | - | - | 11 | 3% | 161 | 48% | 6 | 2% | 320 | 31% | 553 | 1,086 |
| | | Skookumchuck H | 5 | 0 | 1% | 3 | <1% | 68 | 11% | - | - | 9 | 1% | 97 | 15% | 15 | 3% | 1,085 | 69% | 1,271 | 1,864 |
| | Willapa | Forks Creek H | 6 | 3 | 2% | 0 | <1% | 50 | 7% | 1 | <1% | 21 | 3% | 126 | 27% | 6 | 2% | 652 | 58% | 861 | 1,879 |
| | | Naselle H | 6 | 33 | 2% | 0 | <1% | 46 | 12% | - | - | 14 | 4% | 151 | 73% | 2 | 1% | 64 | 9% | 279 | 994 |
| | | Nemah H | 4 | 3 | 2% | 2 | <1% | 76 | 14% | - | - | 29 | 7% | 110 | 41% | 1 | 1% | 412 | 55% | 632 | 1,279 |
| L.S. | Mid and Upper | Oxbow H | 4 | - | - | - | - | 9 | 3% | 7 | 2% | 6 | 3% | 30 | 18% | 1 | <1% | 448 | 73% | 500 | 630 |
| | | Klickitat H | 6 | 1 | 1% | 0 | 1% | 90 | 40% | 9 | 4% | 42 | 21% | 68 | 26% | 6 | 5% | 2 | <1% | 208 | 310 |
| | | Cowlitz H | 7 | - | - | - | - | 27 | 9% | 14 | 5% | 21 | 8% | 108 | 63% | 1 | <1% | 102 | 13% | 362 | 819 |
| | | Washougal H | 4 | 21 | 1% | 21 | 1% | 90 | 24% | 11 | 5% | 45 | 14% | 68 | 19% | 2 | 1% | 286 | 35% | 498 | 840 |
| | | Wells H | 2 | - | - | - | - | 3 | 1% | 1 | <1% | - | - | 165 | 95% | 1 | <1% | 26 | 4% | 155 | 425 |

Table 3-4. Number of tagged and marked Coho Salmon sampled (Obs) and percent of total estimated tags (expanded for the sample rate) in fisheries or in escapement, averaged over brood years 2003–2008.

| Region | | Hatchery / Release Location | # Years Tagged | Mark-Selective Fisheries | | | | | | | | | | Non-Selective Fisheries | | | | Escapement | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | BC | | Puget Sound | | WA Coast | | Columbia R | | OR Coast | | Commercial | | Sport | | | | | |
| | | | | Obs | % of Est | Obs | % of Est | Obs | % of Est | Obs | % of Est | Obs | % of Est | Obs | % of Est | Obs | % of Est | Obs | % of Est | Obs | Est |
| CR | Lower CR | Big Creek H | 6 | - | - | - | - | 18 | 6% | 5 | 3% | 15 | 7% | 70 | 32% | 1 | 1% | 317 | 51% | 424 | 632 |
| | | Bonneville H | 5 | - | - | - | - | 47 | 7% | 16 | 3% | 46 | 8% | 26 | 5% | 2 | <1% | 1418 | 77% | 1,555 | 1,856 |
| | | CEDC Youngs Bay Net | 4 | - | - | - | - | 32 | 8% | 11 | 4% | 27 | 8% | 293 | 80% | 1 | <1% | 16 | 1% | 379 | 1,118 |
| | | Cowlitz Salmon H | 6 | 8 | 2% | 4 | <1% | 374 | 28% | 40 | 6% | 163 | 15% | 178 | 13% | 19 | 2% | 792 | 34% | 1,578 | 2,893 |
| | | Deep River NP | 6 | - | - | - | - | 16 | 6% | 5 | 2% | 15 | 6% | 225 | 83% | - | - | 20 | 2% | 281 | 728 |
| | | Eagle Creek NFH | 6 | - | - | - | - | 15 | 7% | 6 | 4% | 17 | 11% | 22 | 27% | - | - | 104 | 51% | 165 | 481 |
| | | Elochoman H | 5 | <1 | 2% | - | - | 23 | 14% | 3 | 2% | 18 | 14% | 38 | 22% | 1 | 1% | 159 | 44% | 243 | 369 |
| | | Faller Creek H | 6 | - | - | - | - | 22 | 12% | 7 | 8% | 18 | 12% | 11 | 10% | - | - | 252 | 57% | 310 | 431 |
| | | Grays River H | 6 | 1 | 1% | 1 | <1% | 34 | 18% | 8 | 5% | 31 | 18% | 44 | 26% | 1 | <1% | 180 | 31% | 298 | 495 |
| | | Kalama Falls H | 6 | 1 | 2% | 1 | <1% | 40 | 13% | 5 | 7% | 23 | 9% | 51 | 16% | 1 | 1% | 351 | 52% | 472 | 694 |
| | | Klaskanine H | 3 | - | - | - | - | 7 | 6% | 2 | 2% | 5 | 5% | 42 | 56% | - | - | 95 | 31% | 151 | 312 |
| | | Klaskanine S FK Pond | 3 | - | - | - | - | 28 | 9% | 10 | 4% | 21 | 7% | 140 | 63% | 1 | <1% | 141 | 16% | 341 | 908 |
| | | Lewis River H | 6 | 3 | 1% | 6 | <1% | 261 | 12% | 61 | 9% | 148 | 8% | 174 | 8% | 4 | <1% | 2,507 | 62% | 3,164 | 5,055 |
| | | North Toutle H | 6 | - | - | - | - | 34 | 11% | 15 | 11% | 30 | 12% | 14 | 6% | 1 | <1% | 414 | 60% | 508 | 810 |
| | | Sandy H | 6 | 1 | <1% | 1 | <1% | 49 | 11% | 16 | 5% | 38 | 10% | 75 | 16% | 2 | <1% | 665 | 58% | 845 | 1,174 |
| OR | OR Coast North | Nehalem H | 4 | 1 | <1% | - | - | 12 | 2% | - | - | 20 | 5% | 3 | 1% | 1 | <1% | 1,023 | 91% | 1,060 | 1,129 |
| | | Salmon River H | 3 | - | - | - | - | 4 | 5% | - | - | 5 | 11% | 1 | 1% | 1 | 3% | 110 | 80% | 121 | 139 |
| | | Trask River H | 2 | - | - | 2 | <1% | 18 | 4% | - | - | 65 | 14% | 4 | 1% | 1 | <1% | 1,102 | 81% | 1,191 | 1,379 |
| | OR Coast South | Butte Falls H | 1 | - | - | 1 | 2% | 8 | 13% | - | - | 11 | 24% | 5 | 21% | 2 | 15% | 23 | 24% | 50 | 98 |
| | | Cole Rivers H | 6 | - | - | - | - | - | - | - | - | 1 | 2% | - | - | 1 | 1% | 182 | 97% | 185 | 187 |
| | | Rock Creek H | 3 | - | - | - | - | 4 | 9% | - | - | 32 | 76% | 1 | 5% | 2 | 7% | 2 | 2% | 42 | 113 |

Table 3-5. Number of tagged and marked Chinook Salmon sampled (Obs) and percent of total estimated CWTs (% of Est) in fisheries or in escapement averaged over brood years 2001–2006.

| | | Mark-Selective Fisheries | | | | | | | | | | Non-Selective Fisheries | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PS | | WA CST | | COLR | | TERM | | Total | | Commercial | | Sport | | Escapement | | Total | |
| Region | Stock | Obs | %Est | Obs | %Est | Obs | %Est | Obs | %Est | Obs | %Est | Obs | %Est | Obs | %Est | Obs | %Est | Obs | Est |
| British Columbia | Atnarko Summer | - | - | - | - | - | - | - | - | - | - | 52 | 36% | 12 | 18% | 19 | 46% | 83 | 352 |
| | Big Qualicum | 1 | 1% | - | - | - | - | - | - | 1 | 1% | 23 | 21% | 20 | 32% | 44 | 46% | 88 | 305 |
| | Chehalis (Harrison Fall Stock) | 2 | 1% | 3 | 1% | - | - | - | - | 5 | 2% | 58 | 24% | 26 | 17% | 11 | 56% | 99 | 704 |
| | Chilliwack (Harrison Fall Stock) | 5 | 1% | 5 | 1% | - | - | - | - | 11 | 2% | 116 | 20% | 67 | 25% | 18 | 53% | 212 | 1,725 |
| | Cowichan Fall | 1 | 1% | <1 | <1% | - | - | - | - | 1 | 1% | 27 | 28% | 25 | 46% | 28 | 24% | 81 | 297 |
| | Dome Creek Spring | - | - | - | - | - | - | - | - | - | - | 1 | 52% | 1 | 30% | 2 | 18% | 4 | 24 |
| | Kitsumkalum Summer | - | - | - | - | - | - | - | - | - | - | 91 | 30% | 48 | 27% | 17 | 43% | 156 | 820 |
| | Nanaimo River Fall | - | - | - | - | - | - | - | - | - | - | 8 | 9% | 19 | 33% | 8 | 58% | 35 | 259 |
| | Nicola River Spring | <1 | <1% | 1 | <1% | - | - | - | - | 1 | 1% | 10 | 12% | 16 | 14% | 12 | 73% | 39 | 346 |
| | Puntledge Summer | - | - | - | - | - | - | - | - | - | - | 12 | 19% | 12 | 27% | 28 | 54% | 52 | 171 |
| | Quinsam Fall | - | - | - | - | - | - | - | - | - | - | 37 | 28% | 20 | 29% | 48 | 43% | 105 | 344 |
| | Robertson Creek | - | - | - | - | - | - | - | - | - | - | 200 | 46% | 97 | 33% | 44 | 21% | 341 | 1,356 |
| | Lower Shuswap River Summers | - | - | <1 | <1% | - | - | - | - | <1 | <1% | 99 | 36% | 57 | 29% | 22 | 34% | 178 | 899 |
| WA Puget Sound | George Adams Fall Fingerling | 20 | 7% | 9 | 3% | - | - | 5 | 2% | 34 | 12% | 99 | 36% | 37 | 21% | 706 | 30% | 876 | 1,026 |
| | Green River Fall Fingerling | 15 | 5% | 5 | 2% | - | - | - | - | 20 | 7% | 208 | 51% | 32 | 16% | 510 | 25% | 770 | 862 |
| | Grovers Creek Fall Fingerling | 30 | 9% | 10 | 3% | - | - | - | - | 40 | 12% | 118 | 28% | 46 | 18% | 1,047 | 42% | 1,251 | 1,133 |
| | Nisqually Fall Fingerling | 28 | 6% | 7 | 2% | - | - | 1 | 1% | 36 | 9% | 333 | 61% | 31 | 10% | 686 | 20% | 1,086 | 1,604 |
| | Nooksack Spring Fingerling | 4 | 3% | 1 | 1% | - | - | 1 | 0% | 6 | 4% | 65 | 38% | 28 | 31% | 146 | 27% | 245 | 543 |
| | Samish Fall Fingerling | 15 | 4% | 9 | 2% | - | - | - | - | 24 | 6% | 326 | 59% | 57 | 22% | 264 | 13% | 671 | 1,385 |
| | Skagit Spring Fingerling | 8 | 2% | 2 | 1% | - | - | 107 | 23% | 117 | 26% | 162 | 22% | 40 | 19% | 758 | 32% | 1,078 | 1,155 |
| | Skagit Spring Yearling | 9 | 7% | 1 | 1% | - | - | 58 | 32% | 68 | 40% | 50 | 15% | 20 | 22% | 251 | 23% | 389 | 463 |
| | Skykomish Fall Fingerling | 5 | 4% | 2 | 2% | - | - | - | - | 7 | 7% | 30 | 24% | 15 | 22% | 385 | 47% | 437 | 385 |
| | South Puget Sound Fall Yearling | 9 | 23% | 1 | 1% | - | - | - | - | 10 | 25% | 16 | 24% | 10 | 35% | 63 | 16% | 99 | 165 |
| | Skagit Summer Fingerling | 1 | 1% | 1 | 1% | - | - | - | - | 2 | 1% | 145 | 40% | 19 | 15% | 80 | 43% | 246 | 655 |
| | Stillaguamish Fall Fingerling | 8 | 5% | 2 | 1% | - | - | - | - | 10 | 7% | 51 | 24% | 24 | 27% | 177 | 42% | 262 | 513 |
| | White River Spring Fingerling | 4 | 12% | <1 | 2% | - | - | - | - | 4 | 14% | 17 | 39% | 7 | 30% | 39 | 16% | 67 | 101 |

Table 3-5. (Continued) Number of tagged and marked Chinook Salmon sampled (Obs) and percent of total estimated CWTs (% of Est) in fisheries or in escapement averaged over years 2006–2010.

| | | Mark-Selective Fisheries | | | | | | | | | | Non-Selective Fisheries | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PS | | WA CST | | COLR | | TERM | | Total | | Commercial | | Sport | | Escapement | | Total | |
| Region | Stock | Obs | %Est | Obs | %Est | Obs | %Est | Obs | %Est | Obs | %Est | Obs | %Est | Obs | %Est | Obs | %Est | Obs | Est |
| WA Coast | Hoko Fall Fingerling | <1 | <1% | 1 | 1% | <1 | <1% | <1 | <1% | 1 | 1% | 36 | 33% | 11 | 47% | 161 | 49% | 209 | 318 |
| | Quects Fall Fingerling | - | - | - | - | - | - | - | - | - | - | 188 | 66% | 37 | 12% | 20 | 22% | 244 | 947 |
| | Sooes Fall Fingerling | - | - | 1 | 1% | - | - | - | - | 1 | 1% | 23 | 38% | 9 | 20% | 117 | 41% | 149 | 171 |
| Columbia R | Cowlitz Fall Tule | <1 | <1% | 1 | 2% | <1 | <1% | <1 | <1% | 1 | 2% | 22 | 30% | 12 | 23% | 193 | 45% | 228 | 187 |
| | Hanford Wild | - | - | - | - | - | - | - | - | - | - | 52 | 59% | 12 | 26% | 13 | 16% | 76 | 261 |
| | Columbia Lower R. H. | <1 | <1% | 3 | 3% | - | - | - | - | 4 | 3% | 65 | 60% | 23 | 21% | 150 | 16% | 242 | 893 |
| | Lewis River Wild | - | - | - | - | - | - | - | - | - | - | 27 | 43% | 7 | 30% | 49 | 27% | 83 | 175 |
| | Lyons Ferry | - | - | 5 | 1% | - | - | - | - | 5 | 1% | 185 | 39% | 74 | 16% | 280 | 44% | 545 | 1,564 |
| | Lyons Ferry Yearling | - | - | 23 | 2% | 1 | <1% | - | - | 24 | 2% | 567 | 44% | 233 | 20% | 1,168 | 34% | 1,992 | 8,127 |
| | Spring Creek Tule | 3 | <1% | 7 | 2% | - | - | - | - | 10 | 2% | 290 | 70% | 61 | 14% | 256 | 14% | 616 | 1,480 |
| | Columbia Summers | - | - | 1 | <1% | 5 | <1% | - | - | 5 | 1% | 304 | 55% | 84 | 24% | 478 | 21% | 870 | 1,749 |
| | Upriver Brights | - | - | 1 | <1% | - | - | - | - | 1 | <1% | 135 | 53% | 36 | 23% | 428 | 23% | 601 | 807 |
| | Willamette Spring | - | - | 2 | <1% | 43 | 5% | 142 | 35% | 187 | 40% | 236 | 22% | 56 | 11% | 955 | 27% | 1,433 | 2,100 |
| OR Coast | Elk River | - | - | - | - | - | - | - | - | <1 | <1% | 241 | 35% | 164 | 25% | 913 | 40% | 1,318 | 2,033 |
| | Salmon River | - | - | - | - | - | - | - | - | - | - | 180 | 35% | 156 | 46% | 155 | 19% | 491 | 1,468 |

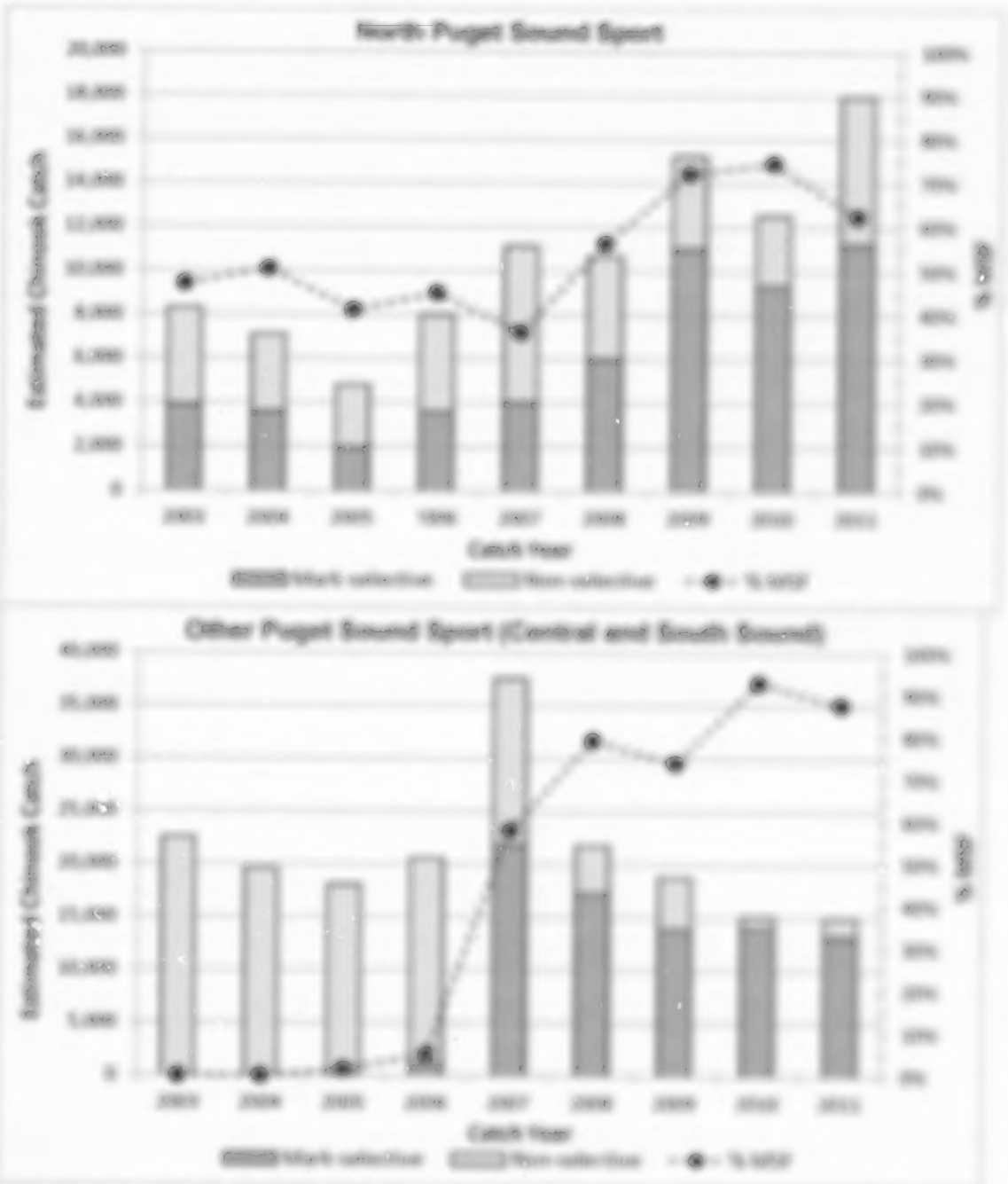


Figure 3-1. Total landed catch in MSF's and NSF's in Puget Sound and the percent of catch in MSF's for catch years 2003- 2011.

# 6 [illegible]

## 6.1 Timeliness of Mark-Selective Fishery Proposals

Proposals are due by November 1 of the year before the MSF's being proposed, e.g., November 1, 2012 for fisheries proposed to occur in 2013–2014. Although final decisions on fisheries are generally made by agencies after this time period (e.g., January–April of 2013 for 2013 fisheries), MSF proposals should be submitted for any fisheries that are planned and should include information or options known at that point in time. WDC believes that most MSFs now being implemented are represented by proposals, although some Columbia River MSFs may not be represented. The WDC recommends that agencies prioritize the task of developing proposals in a timely manner for any planned MSF in marine or freshwater. Timely submission of proposals allows for timely identification of issues which can be conveyed to the PSC and to agencies while the annual fishery planning activities are occurring.

## 6.2 Timing of Mark-Selective Fishery Reports

The PSC has requested that management agencies provide WDC with three reports on MSFs. The first is a table (Appendix Table C.1) that provides information on sampling methods used to recover CWTs in all fisheries and management locations, not just in the MSFs. Information on sampling procedures is needed because estimating impacts for the unmarked group encountered in MSFs depends on the method of sampling (electronic or visual) and the CWT processing protocol (i.e., are all tagged fish sampled also processed for CWT extraction in the lab). The second report is a table (Appendix Table C.2) that provides post-fishery information on MSFs that have occurred, where and when they occurred, fishery regulations, and what sampling occurred. This table provides the information on whether MSFs that were proposed did actually occur and how these fisheries were sampled. These first two tables should be completed by the PSC post-season meeting of the year following the fishery year. For instance, reports on fisheries occurring in 2012–2013 should be available by the post-season meeting in 2013. The post-season annual reports produced by the U.S. and Canadian sections for PSC's 2012 post-season review meeting did not include this information for most MSFs.

The third report is also in table format (Appendix Table C.3) and is intended to provide final results on the estimated total recreational and mark rates in MSFs that have been processed. This information is required for re-evaluation of the fishery. For Chinook fisheries, the PSC Chinook Technical Committee (CTC) requires that total fish retained and total recreational are reported for MSFs for use in the PSC Chinook Model. It should be noted that the template provided in Appendix Table C.3 was new in 2007, and the previous template should not be used as it was inadequate for CTC needs. Using estimates from the WDFW draft multi-year report for the summer MSFs in Washington Areas 7/7A, an example of this report template is provided in Appendix Table C.3.

[illegible]

### 6.6 Chemical MOF Loading Workflow

Experimental data collection is necessary for validating theoretical predictions and understanding how functionalized MOFs perform in real-world applications. The following workflow describes a standardized procedure for loading a model drug molecule into a carboxylate-functionalized MOF and measuring the release profile under simulated physiological conditions. Each step includes specific parameters and quality control checkpoints to ensure reproducibility across different laboratories.

Begin by preparing a stock solution of the drug molecule at a concentration of 1.0 mg/mL in a suitable solvent, typically ethanol or a phosphate buffer depending on the drug's solubility profile. Weigh out 10 mg of the activated MOF powder and add it to 10 mL of the drug solution in a sealed glass vial. Place the vial on a rotary shaker at 150 rpm and allow the mixture to equilibrate for 24 hours at room temperature. After equilibration, centrifuge the suspension at 8000 rpm for 10 minutes to separate the loaded MOF particles from the supernatant. Carefully collect the supernatant and measure its absorbance using a UV-Vis spectrophotometer at the drug's characteristic wavelength. Calculate the loading efficiency by comparing the initial drug concentration to the concentration remaining in the supernatant after loading.

### 6.7 Mixed-Ligand Functionalization of MOFs

Functionalization of metal-organic frameworks can be accomplished through a variety of post-synthetic modification strategies, each offering distinct advantages depending on the desired application. One common approach involves covalent attachment of functional groups to the organic linkers after the framework has been assembled, using reactive handles such as amine or carboxylate groups that are incorporated into the original linker design. This method preserves the crystallinity of the parent material while introducing new chemical functionality at specific locations within the pore structure.

Another widely used technique is coordinative post-synthetic exchange, in which labile solvent molecules or counterions coordinated to the metal nodes are replaced by incoming ligands that bind more strongly to the metal centers. This approach can be carried out under relatively mild conditions and is particularly useful for introducing functional groups that would not survive the harsh solvothermal conditions typically required for MOF synthesis. The extent of exchange can be monitored by digesting small samples of the modified framework in acid and analyzing the resulting solution by nuclear magnetic resonance spectroscopy.

Table 4-1 Types of Internal Regulations as prescribed in the RMDA

| Regulation Type | Example | Location |
|---|---|---|
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |

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[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

# 6 APPENDICES

## *Appendix A. Understanding of the Pacific Salmon Commission Concerning Mass Marking and Selective Fisheries (Revised February 2004).*

**Understanding of the**
**Pacific Salmon Commission**
**Concerning**
**Mass Marking and Mark Selective Fisheries**

**February 2004 Policy Statement**

The Pacific Salmon Treaty's Memorandum of Understanding (MOU) obliges the Parties to, among other things, "maintain a coded-wire-tag and recapture program designed to provide statistically reliable data for stock assessment and fishery evaluation." The Pacific Salmon Commission (PSC) recognizes that the selective fisheries for marked hatchery Coho and Chinook salmon can impact the coastwide coded-wire-tag (CWT) program. For the sole purpose of fulfilling this MOU obligation, the PSC has established the following policies and procedures. This policy does not preclude the PSC from evaluating the impacts of, and making recommendations concerning, mass marking or selective fishery plans as they affect the negotiation and establishment of Treaty annex provisions.

It shall be the policy of the PSC to review proposals for mass marking and selective fisheries to determine consistency with the Parties' commitment to the MOU provisions regarding the reliability of data needed for management of salmon fisheries within the jurisdiction and management area of the Treaty, including whether they impose substantial cost increases for agencies to conduct required data collecting programs.

The PSC shall establish a Selective Fishery Evaluation Committee (SFEC) to perform the activities set forth in the attached Terms of Reference.

To facilitate the SFEC review, the Parties shall do their utmost to ensure that their domestic managers submit all proposals for mass marking (MM) and mark-selective fisheries (MSF) which could potentially affect stocks or fisheries of concern to the PSC in accordance with the following schedule:

1. Not later than June 1 of each year. Provide early notice containing the agency's plans to consider conducting MSF's over the next 3-5 years.
2. Not later than June 1 of the year prior to implementation. Provide new or substantially changed MM or MSF project proposals.
3. Not later than November 1 of the year prior to implementation. Provide proposals for MM or MSF programs that are anticipated to continue annually without substantive change.
4. Upon completion of domestic fishery planning processes, agencies conducting MSF's are to provide final selective fishery plans.

5. Upon completion of MM programs, agencies are to report the number of fish that were actually mass marked and the extent to which releases are (single and double index) tagged for assessment.
6. Agencies shall report results of MSFs conducted during a season in the annual post-season report provided, using a format specified by the SFEC.
7. Not later than November 30 of the year following conduct of MSFs. Agencies are to report fishery and stock-age-specific estimates of mortalities for unmarked fish impacted by MSFs to the PSC technical committees

- The PSC shall consider, by the annual February PSC meeting, the SFEC reviews of proposals for MM and MSFs and discuss potential actions to address concerns related to any MM or MSF proposals that the SFEC determines will significantly and adversely affect the CWT program.
- The Parties will do their utmost to ensure that MM and MSF proposals are developed in consultation with domestic co-management agencies or processes, and that proposing agencies or entities provide information required by the SFEC and adhere to reporting requirements to enable the PSC technical committees to complete their assignments in a timely manner.
- After the occurrence of a selective fishery and when the data are available, the PSC shall review the management agency report on the actual conduct of the fishery with respect to its impact on the CWT program, and recommend changes and improvements.

**Terms of Reference for the Selective Fishery Evaluation Committee**

I. Reporting and Committee Structure: The Selective Fishery Evaluation Committee (SFEC) will report to the PSC and will be comprised of a Steering Committee and two working groups: the Regional Coordination Working Group (RCWG) and the Analytical Working Group (SFAWG). All official members of the Steering Committee and working groups will be considered members of the SFEC.

A. Steering Committee: The Steering Committee will be comprised of:
   1. the co-chairs of the PSC Coho Technical Committee, Chinook Technical Committee, and Data Sharing Technical Committee;
   2. the co-chairs of the two working groups;
   3. agency mass-marking/selective-fishery coordinators; and
   4. additional agency representatives approved by the responsible Party.

B. Regional Coordination Working Group (RCWG): The RCWG may be comprised of members of the Steering Committee and other PSC technical committees and of the agency representatives approved by the responsible Party. All RCWG members should contribute actively to the work of this group.

C. Selective Fishery Analysis Working Group (SFAWG): The SFAWG may be comprised of members of the Steering Committee and other PSC technical committees and of the agency representatives approved by the responsible Party. All SFAWG members should contribute actively to the work of this group.

II. Duties of the SFEC

A. Serve as a coastwide clearinghouse to facilitate the appropriate level of coordination and reporting on MM and MSF programs among the Parties, affected agencies, and existing coastwide and regional committees established to monitor activities related to the coastwide CWT program;

B. Provide advice to the PSC regarding potential adverse impacts of MM and MSFs on the CWT program;

C. Assess and monitor the cumulative impacts of MSFs on stocks of concern to the PSC;

D. Provide MM or MSF project proponents with information regarding concerns for potential impacts of their projects on the CWT program.

E. Receive and review MM and MSF proposals from the proponent(s) as early in the planning process as possible to identify potential issues and concerns regarding impacts on the CWT program.

F. Establish a technical evaluation process that will:

1. Review proposed mass-marking/selective-fisheries initiatives developed by the proponent(s) and identify potential impacts on other jurisdictions and the CWT program;
2. Review, in consultation with relevant PSC technical committees, procedures and protocols for marking, sampling, and evaluation developed by the proponent(s) and, if appropriate, develop and recommend alternative procedures to address potential concerns or measures that could be taken to mitigate for adverse impacts on the CWT program;
3. Establish standard formats and reporting requirements for agencies conducting MSFs to use when providing post-season information. Review post-season agency evaluations of the performance of MSFs and their estimates of mortalities on stocks of concern to the PSC;
4. Identify information needs or request modifications of proposals to meet concerns regarding impacts on the CWT program; and
5. Conduct, at agreed intervals, technical evaluations of mass marking and selective fishery programs in order to assist the Parties to maintain the integrity of the CWT program.

G. Work with PSC Technical Committees to establish formal standards and objectives for a viable CWT program to enable more precise evaluation of potential impacts of MM and MSFs on the viability of the coastwide CWT program and to guide the development of mitigation measures.

H. Specific duties of the Steering Committee include being responsible for overall coordination and prioritization of the activities for the working groups and being the focal point for reporting to the PSC. The agency mass-marking/selective-fishery coordinators should ensure that mass marking and selective fishery proposals are provided to the SFEC in a timely manner.

III. Specific duties of the RCWG, among other related activities, include:

A. Coordinate and report on continuing research on electronic detection and mass marking technologies;
B. Collate and share information on CWT sampling procedures and programs; suggest modifications to sampling and monitoring programs to proponents;
C. Review MM proposals to determine potential impacts on sampling and tagging programs;
D. Provide agencies with a list of MM and MSF proposals received by the SFEC;
E. Provide the necessary liaison with the Data Standards Working Group of the Data Sharing Technical Committee to ensure that necessary modifications are made to PSC data exchange formats to maintain the integrity of the CWT system; and
F. Prepare an annual report summarizing mass marking statistics, index tag groups, and sampling programs for marks and CWTs.

IV. Specific duties of the SFAWG, among other related activities, include:

A. Design marking and sampling strategies that will achieve desired precision for CWT-based estimates;
B. Develop analytical tools for the evaluation, by the SFEC and MSF proponents, of MM programs and MSFs and their potential impacts on the coastwide CWT program;
C. Provide the necessary technical liaison with agencies and other coastwide committees working on selective fishery evaluation models;
D. Review and recommend parameter values for assessing impacts of MSFs;
E. Develop analytical tools for estimating the impacts of MSFs on escapements and exploitation rates for naturally spawning Coho and Chinook stocks based on post-season information;
F. Review MSF proposals and provide advice to the proponents regarding the design of MSFs and the conduct of sampling and monitoring programs; and
G. Recommend guidelines, procedures, and/or time frames necessary to evaluate the success of MSFs in conserving naturally spawning stocks.

L. Cassidy J. Davis
Chair Chair

## *Appendix B. Mass Marking Proposal Template.*

| Mass Marking Proposal ID # |
|---|
| Date Received |

### TEMPLATE FOR ADIPOSE FIN MASS MARKING PROPOSALS

This template is intended for proposals to mass mark any release group of more than 100,000 fish from a hatchery complex or area that involves the following:

1) Chinook or Coho Salmon,
2) mass marked with an adipose clip, but untagged, and
3) expected to be intercepted in Pacific Salmon Commission fisheries.

**PROPOSAL TITLE:**

Contact information

| | |
|---|---|
| Proposing Agency: | |
| Contact Person: | |
| Mailing Address: | |
| Phone Number: | |
| Fax: | |
| Email: | |

Is the proposal:

new _____
substantially changed _____
or a continuation of a previous proposal _____

Proposed Marking and Tagging

1. Purpose of mass marking:
    a. Provide a brief description of the goals and objectives of the proposal (e.g. to obtain more information on hatchery straying to wild spawning grounds, to increase fishing opportunities, or to identify hatchery/wild compositions in fisheries).

    b. If the proposal is not a new proposal, list the Mass Marking Proposal ID number(s) (assigned by the PSC Executive Secretary) corresponding to the previous proposal. In addition, describe any significant differences from previous proposals (i.e., additions or deletions of mass marked stocks or DIT groups).

    c. Identify potential mark-selective fisheries targeting the proposed mass marked stocks that your agency might pursue in the future.

2. List all proposed mass marking and DIT plans (see example format below), including the following fields: area/region, hatchery, stock, number of fish to be tagged with and without fin clip, number of fish to be untagged with and without fin clip, and prior marking status.

*Example format for proposed mass marking and tagging plans. DIT groups identified with an asterisk (*).*

*Species:*
*Brood:*
*Release Year:*

| *Area or Region* | *Hatchery* | *Stock* | *Number to be Tagged* | | *Number Untagged* | | *Proposed to be Marked This Brood Year* | *Marked Last Brood Year* |
|---|---|---|---|---|---|---|---|---|
| | | | *Ad Clipped* | *Unclipped* | *Ad Clipped* | *Unclipped* | *(Y/N)* | *(Y/N)* |
| | | | | | | | | |
| | | *Total* | | | | | | |

3. List any known reviews of the mass marking proposal that have been conducted (e.g., by the Mark Committee) and the outcome of those reviews. List any marking programs/agreements that this proposal may conflict with and briefly describe the possible conflict.

4. List any issues of concern previously identified by the SFEC related to this mass marking proposal and describe how those concerns have been addressed.

**FISHERY DISTRIBUTION AND CWT SAMPLING**

5. Provide estimates of the anticipated number of mass marked fish that will be encountered in fishery CWT sampling programs using the format below. In order to standardize estimates between agencies, we would prefer the following methods be used:
   - Use actual CWT recoveries from representative CWT groups (e.g., key or indicator stocks from each region) as basis of estimate
   - Calculate the average recovery rate of tags (# recoveries / # releases), using the following three brood years: Coho = BYs 2005-2007, Chinook = BYs 2003-2005
   - Multiply the # of proposed mass marked fish, by production region, by this recovery rate, for the appropriate indictor stock
   - Apportion the mass marked fish to the region/fisheries (see table below) based on the average distribution for the indicator codes
   - The PSMFC RMIS will provide a standardized report that summarizes recoveries in the requested region/fisheries. Simply provide them with a vertical text listing of the tag codes.

| Region | Fishery | Estimated number of marked fish that will be encountered in fishery sampling programs. | Electronic sampling currently in place Y/N? |
|---|---|---|---|
| Alaska | Commercial | | |
| | Sport | | |
| Northern BC | Commercial | | |
| | Sport | | |
| Southern BC | Commercial | | |
| | Sport | | |
| Washington (Coast & PS) | Commercial | | |
| | Sport | | |
| Columbia Basin | Commercial | | |
| | Sport | | |
| Oregon Coast | Commercial | | |
| | Sport | | |
| California | Commercial | | |
| | Sport | | |

Describe the source/data and methods used to make the estimates – if different than the preferred method. Provide other information, if relevant, on the distribution, run timing and migration routes of the stocks proposed for marking and/or tagging.

## *Appendix C. Mark-Selective Fishery Proposal Template.*

| Mark-Selective Fishery Proposal ID # |
|---|
| Date Received |

**TITLE FOR MARK-SELECTIVE FISHERY PROPOSALS**

## Contact information

| | |
|---|---|
| Proposing Agency: | |
| Contact Person: | |
| Mailing Address: | |
| Phone Number: | |
| Fax: | |
| Email: | |

Is the proposal:

new or not yet reviewed by PSC-SFEC _____
substantially changed _____

## Purpose/management objective

**Describe the management objective of the proposed mark-selective fishery.**

## Location and time of the proposed mark-selective fishery

Please include any information when there are breaks or changes in regulations that might impact sampling stratification (see Question 7b below)

1. Location of the fishery:

2. Year and month(s) when the fishery is proposed to occur:

## Other information about the fishery:

3. Target species/stocks (including nontarget PSC species/stocks of concern):

4. Gear to be used:

5. Other regulation details (e.g., size restrictions, bag limits, mixed bag information):

## Projected impacts BY the fishery

6. Identify all (coastwide) CWT stocks likely to be encountered in this fishery (including individual tag codes if available), whether those stocks were Double Index Tagged (DIT). Appendices F and G provide tables of tagged indicator stocks for Coho and Chinook for your convenience. Please note we are interested in tagged impacts alone; untagged hatchery production should not be included.

## In-season management

7. Describe your sampling program for sampling for CWTs, marks and estimation of total catch. Attach your sampling plan if available. At a minimum, include descriptions for the following:
   a. CWT recoveries.
      i. Will there be *random* sampling of CWTs (i.e., fishers exiting fisheries contacted for biological sampling of harvest) or will you be using voluntary programs?
      ii. If *random* will there be ETD or visual identification of tagged fish?
      iii. If ETD in *random* samples, will all tagged fish (marked and unmarked) be processed?
      iv. If *random* what is the expected sample rate for CWTs?
      v. If voluntary programs are used, how is the awareness factor estimated?
   b. Monitoring for retained catch by sample strata for sample expansions. The sample strata and the strata of catch estimation must match the location/time/regulation strata (i.e., whenever there is a change in regulation such as from MSF to non-selective, or change in bag limits, the sampling strata should also change).
   c. Monitoring of mark rate in the MSF (this is the total mark rate, percent marked in the harvest from the fishery).
   d. Other information, e.g., retained unmarked fish (mixed bag fisheries, or mark recognition error in MSF).

## Other information

8. Please include any other information that will be useful for estimation of unmarked tagged mortalities in your MSF. For instance, sources of estimates of unmarked to marked ratios for DIT tagged groups (e.g., in a test fishery, nearby hatchery, non-selective fishery). Please provide any input you wish on approach to estimate the unmarked tagged mortalities for DIT groups, or for appropriate release mortality rates to be used.

## Appendix D. Mark-Selective Fishery Proposal Spreadsheet Template

| Agency and Contact Information | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fishery Information | | | | Other regulations | | | CWT marks | | Sampling program | | | | Other sources of fish not subject to selective retention and mark rates |
| Region and Fishery Area | Month (For Area) | Fishery (eg. troll, Fraser net, and Gear) | Species (Target and Mark selective) | Reg limits adult and jacks to mark rates) | Licence Num (catch) | Other regulations (examples: e.g., open fishy, gear restrictions, mark rates) | Numbers and Mark Rates | Indicator or ORF | CWT sampling method (e.g., method above or references) | Tag Recovery Method | Est. CWT Tags Processed | Other sampling (mark rate, ethnic recovery, rate compliance) | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
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*Appendix E: Status of Main Working Proposals Received by 3M (as Main Working or Above by 3M)*

| Description of Proposal and Agency | Main or Complementary Proposal | 3M's Proposed Position |
|---|---|---|
| **Lake Indiana** | | |
| Southern I-80 – 5 lanes – I-65/I-94 | Complementary | Main/Above (1) |
| Regal Grande/I-94 – Widen/Widen/Widen | Complementary | Main/Above/Above (2) |
| Washington/I-94 and I-94 – Widen/Widen/Widen | Complementary | Main/Above/Above (3) |
| Washington/I-94 Interchange/Widen/I-94 – Widen/Widen | Complementary | Main/Above/Above (4) |
| I-94 Interchange/Widen/I-94 – I-65/I-94/I-94 | Complementary | Main/Above/Above (5) |
| Regal Grande and I-94/I-94 and I-94 – I-65/I-94/I-94 | Complementary | Main/Above/Above (6) |
| I-94 Interchange/Widen/I-94 – I-94/I-94 | Complementary | Main/Above/Above (7) |
| Regal/I-94 and I-94 – I-94/I-94 | Complementary | Main/Above/Above (8) |
| **Grande Indiana** | | |
| Grande/I-94 and Main/Grande – I-94/I-94 | Complementary | Main/Above/Above (9) |
| I-94 Interchange/Widen/Grande – I-65/I-94/I-94 | Complementary | Main/Above/Above (10) |
| Widen/I-94 and I-94/Grande – I-65/I-94/I-94 | Complementary | Main/Above/Above (11) |
| Widen/Widen/Widen/Spring/Grande – I-94/I-94/I-94 | Complementary | Main/Above/Above (12) |
| I-94 – North/I-94 and Spring/Grande – I-94/I-94 | Complementary | Main/Above/Above (13) |
| I-94 – South/I-94 and Spring/Grande – I-94/I-94 | Complementary | Main/Above/Above (14) |
| I-94 Interchange/Widen/I-94/Grande – I-94/I-94 | Complementary | Main/Above/Above (15) |
| I-94/I-94 and I-94/Grande – I-94/I-94 | Complementary | Main/Above/Above (16) |
| Main/I-94 Interchange/Widen/Spring/Grande – I-94/I-94 | Complementary | Main/Above/Above (17) |
| Grande/I-94 and I-94/Grande – I-94/I-94 | Complementary | Main/Above/Above (18) |
| Grande/Widen/Widen/Spring/Grande – I-94/I-94 | Complementary | Main/Above/Above (19) |
| Regal Grande/Grande – Widen/Widen/Widen | Complementary | Main/Above/Above (20) |
| I-94 Interchange/I-94 – Grande – Widen/Widen/I-94/I-94 | Complementary | Main/Above/Above (21) |
| Washington/I-94 and I-94/Grande – Widen/Widen/Widen | Complementary | Main/Above/Above (22) |

## Appendix-V Statement of Assessed Pre-existence Programmable Non-Volatile Memory

| Software Description / Program Module with Purpose | Programmed Off | Name Revision Programmed | Current Status / Date / Signature |
|---|---|---|---|
| [illegible] | | | |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible]

| | | | |
|---|---|---|---|
| | | | |
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## Appendix G. Current PSC Coho CWT Exploitation Rate Indicator Stocks and DIT Groups.

| Region | Stock Representation | Indicator Stocks | DIT |
|---|---|---|---|
| BC North Coast | North Coast Wild | Lachmach | |
| | Skeena | Telegraph | |
| Interior Fraser | Thompson River | Coldwater (Spius Hatchery) | |
| | | Salmon | |
| | | Lemieux | |
| Georgia Basin | East Coast Vancouver Island | Big Qualicum | |
| | | Qualicum River | |
| | East Coast Vancouver Island Wild | Black Creek | |
| | Lower Fraser | Inch Creek | √ |
| | Lower Fraser Wild | Salmon River | |
| | North Vancouver Island | Quinsam River | √ |
| West Coast Vancouver Island | West Coast Vancouver Island | Robertson Creek | |
| Puget Sound | Nooksack | Skookum Creek (I) | |
| | | Lummi Bay Pond | |
| | Skagit | Skagit (Mainstream (I).) | √ |
| | | Baker River Wild | |
| | Stillaguamish/Snohomish | Stillaguamish/Wallace River | √ |
| | | Tulalip Bay (Bernie Gobin) | |
| | Mid Puget Sound | Green River (Soos Creek (I).) | √ |
| | South Puget Sound | Puyallup (Voights Creek (I).) | √ |
| | | Nisqually Pen (Squaxin Net Pens) | |
| | | Nisqually (Kalama Creek (I).) | |
| | Hood Canal Wild | Big Beef Creek | |
| | North Hood Canal | Quilcene Wild | √ |
| | | Quilcene Net Pens | |
| | | Port Gamble Net Pens | |
| | South Hood Canal | George Adams (I) | √ |
| | Dungeness | Dungeness (I) | |
| | Strait of Juan de Fuca | Lower Elwha (I) | √ |
| Washington Coast | North Coast | Hoh Wild | (discontinued) |
| | | Solduc (full run) | √ |
| | North Central Coast | Quillayute Wild (Salmon River (I).) | |
| | | Quillayute (Salmon R. Hatchery) | √ |
| | Quinault R. | Quinault Wild | √ |
| | Grays Harbor | Chehalis R. Wild | |
| | | Satsop Springs Ponds | |
| | | Satsop (Bingham Cr. H. inc.) | |
| | | Satsop (Bingham Cr. H. early) | √ |
| | Willapa Bay | Forks Creek H. (late full run) | |
| | | Forks Creek H. | √ |
| | | Naselle R. H. | |
| | | Naselle H. | |
| Columbia Basin | Lower Columbia River | Lewis River (Type N and S) | √ |
| | | Eagle Creek | √ |
| | | Sandy River | |
| | | Tanner Cr. | √ prior to 2003 |
| Oregon Coast | Oregon South Coast | Rogue River (Cole Rivers) | |

## *Appendix II. Current PSC Chinook CWT Exploitation Rate Indicator Stocks and DIT Groups.*

| Area | Natural/Unmarked Stock Representation | Exploitation Rate Indicator Stocks | Run Type | DIT |
|---|---|---|---|---|
| S.E. Alaska | Southeast Alaska | Alaska Spring | Spring | |
| British Columbia | North/Central BC | Kitsumkalum | Summer | |
| | West Coast Vancouver Is. | Robertson Creek | Fall | |
| | Georgia Strait | Punt ledge | Summer | |
| | | Quinsam | Fall | |
| | | Big Qualicum | Fall | |
| | | Cowichan | Fall | |
| | Lower Fraser River | Chehalis (Harrison Stock)[1] | Fall | |
| | | Chilliwack (Harrison Stock) | Fall | (deleted) |
| Puget Sound | North Puget Sound | Nooksack Spring Fingerling | Spring | (deleted) |
| | | Samish Fall Fingerling | Fall | √ |
| | Central Puget Sound | Skagit Spring Yearling | Spring | √ |
| | | Skagit Spring Fingerling | Spring | |
| | | Skagit Summer Fingerling | Summer | |
| | | Skykomish Summer Fingerlings[2] | Fall | √ |
| | | Stillaguamish Summer/Fall Fingerling | Fall | |
| | Hood Canal | George Adams Fall Fingerling | Fall | √ |
| | South Puget Sound | White River Spring Yearling[3] | Spring | |
| | | Green River Fall Fingerling | Fall | √ |
| | | Grover Creek Fall Fingerling | Fall | √ |
| | | Nisqually Fall Fingerling | Fall | √ |
| | | South Puget Sound Fall Yearling | Fall | |
| | Strait of Juan de Fuca | Hoko Fall Fingerling | Fall | |
| Washington Coast | North Wash. Coast | Sooes Fall Fingerling | Fall | |
| | | Queets Fall Fingerling | Fall | |
| | | Quinault Lake Fall Fingerling[2] | Fall | √ |
| | Willapa Bay | Forks Creek Fall Fingerlings[2] | Fall | √ |
| Columbia River | Columbia R. (Wash) | Cowlitz Tule | Fall Tule | (deleted) |
| | | Spring Creek Tule | Fall Tule | √ |
| | | Little White Salmon[3] | Fall Bright | √ |
| | | Columbia Summers | Summer | |
| | Columbia River (ORe) | Columbia Lower River Hatchery | Fall Tule | √ |
| | Upper Columbia R. | Columbia Upriver Bright | Fall Bright | |
| | | Hanford Wild | Fall Bright | |
| | | Priest Rapids | | √ new |
| | Lower Columbia R. | Lewis River Wild | Fall Bright | |
| | | Willamette Spring | Spring | (deleted) |
| | | Lewis River Spring[3] | Spring | √ |
| | Snake River | Lyons Ferry | Fall Bright | |
| Oregon Coast | North Oregon Coast | Salmon River | Fall | |

[1] These stocks are CWT tagged, but there is no quantitative CWT escapement data useful for distribution only.
[2] DIT group not currently an indicator stock.
[3] No longer adipose-fin clipped.

## *Appendix I. Mark-Selective Fishery Post-Season Report Templates.*

Templates with examples are provided below in Appendix Tables I.1, I.2, and I.3.

**Appendix Table I.1** Sampling methods and processing of tags in all fisheries and escapement locations. This information is required for choice of estimation of impacts on unmarked fish.

| Region | Sampling Location | CWT Sample Method | Detection Method | Tags Processed |
|---|---|---|---|---|
| North | Net | Direct | Electronic | All |
| | Troll | Direct | Electronic | All |
| | Sport | Voluntary | Visual | All |
| Outside | Net | Direct | Electronic | All |
| | Troll | Direct | Electronic | All |
| | Sport | Voluntary | Visual | All |
| Inside | Net | Direct | Electronic | All |
| | Troll | Direct | Electronic | All |
| | Sport | Voluntary | Visual | All |

**Appendix Table I.2**. Information on MSFs that have occurred, locations, periods and locations and what sampling and monitoring was conducted to recover CWTs and estimate total encounters and unmarked mortality and compliance in these MSFs. Compliance includes estimation of mark recognition error (marked fish released) and unmarked retention error (unmarked fish retained and landed). This table provides information on actual implementation of MSFs proposed for season.

| Region | Fishery Area | Fishery Period | Regulations | Sampling and Monitoring Conducted to Estimate: | | | |
|---|---|---|---|---|---|---|---|
| | | | | CWTs | Encounters | Unmarked Mortality | Compliance |
| | | | *Species* | | | | |
| Alaska | No MSF | | | | | | |
| Canada | Str of Georgia Sport<br>WCVI sport | | | Creel & voluntary | Creel, guide logbook, test fishing | No | No |
| Puget Sound | Area 5,6 sport Coho | | | Creel & voluntary | Creel, guide logbook, test fishing | No | No |
| | Area 7 sport Coho | | | Creel @ 22.6% | Creel, test fishing | No | Yes |
| | Area 7 Reef net Coho | | | Creel @ 15.2% | Creel | No | Yes |
| | Area 13 sport Coho | | | Creel @ 0% | No | No | Yes |

| Region | Fishery Area | Fishery Period | Regulations | Sampling and Monitoring Conducted to Estimate: CWTs | Encounters | Unmarked Mortality | Compliance |
|---|---|---|---|---|---|---|---|
| | | | | *Species* | | | |
| Coastal Washington | Area 1 sport Coho | | | Creel @ 11.3% | Creel | No | Yes |
| | Area 2 sport Coho | | | Creel @47% | Creel, observers | No | Yes |
| | Area 3 sport Coho | | | Creel @ 45% | Creel, observers | No | Yes |
| | Area 4 sport Coho | | | Creel @73% | Creel, logbooks | No | Yes |
| | Area 1 troll Coho | | | Creel @ 42% | Creel, test fishing, observers | No | Yes |
| Coastal Oregon | Sport Troll | | | Creel @ 42% | Creel | No | Yes |
| Columbia R | Columbia R | | | Electronic<br>Electronic | Observer &<br>Creel | Yes<br>No | Yes<br>No |
| Columbia River | Buoy 10 sport Coho | | | Electronic<br>Creel @ 38% | Creel<br>Creel , observer | Yes<br>No | Yes<br>Yes |

**Appendix Table I.3**. Estimated catch, encounters, and mortalities by size and mark status in MSF.

| Region | Fishery | Year | Retained Marked Fish | Retained Unmarked fish | Encounters Marked | Encounters Unmarked | % Marked | Legal-sized Marked fish Landed & Release Mortalities | Legal-sized Unmarked fish Landed & Release Mortalities | Sub-Legal-sized Marked fish Landed & Release Mortalities | Sub-Legal-sized Unmarked fish Landed & Release Mortalities |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WA | Area 5/6 | 2003 | 3,417 | 76 | 5,327 | 8,626 | 38% | 3,287 | 140 | 225 | 0 |
| WA | Area 5/6 | 2004 | 3,571 | 5 | 5,102 | 6,365 | 44% | 3,476 | 477 | 366 | 385 |
| WA | Area 5/6 | 2005 | 2,024 | 53 | 3,412 | 3,237 | 51% | 1,981 | 373 | 351 | 237 |
| WA | Area 5/6 | 2006 | 3,641 | 25 | 5,008 | 5,095 | 50% | 3,546 | 63 | 199 | 15 |
| WA | Area 5/6 | 2007 | 3,971 | 124 | 5,784 | 3,839 | 60% | 3,794 | 432 | 540 | 301 |